PB82-111717

O and M Considerations in the Construction Grants Process: Instructor's Manual

Texas A and M Univ.
College Station

Prepared for

National Training and Operational Technology
Center, Cincinnati, OH

Jun 81

U.S. Department of Commerce
National Technical Information Service

50272-101

REPORT DOCUMENTATION PAGE

1. REPORT NO. EPA 430/1-80-003

2.

3. Recipient's Accession No. PB82 111717

4. Title and Subtitle
O & M Considerations in the Construction Grants Process:
Instructors Manual

5. Report Date June 1981

6.

7. Author(s) Dan D. Siebeneicher

8. Performing Organization Rept. No. N/A

9. Performing Organization Name and Address
Texas A & M University
Texas Engineering Extension Service
F E Drawer K
College Station, TX 77843

10. Project/Task/Work Unit No. N/A

11. Contract(C) or Grant(G) No.
(C)
(G) T901051010

12. Sponsoring Organization Name and Address
United States Environmental Protection Agency
National Training and Operational Technology Center
26 West St. Clair
Cincinnati, Ohio 45268

13. Type of Report & Period Covered Final

14.

15. Supplementary Notes
None

Operation and Maintenance

16. Abstract (Limit: 200 words)

Designed for a 3½ day course on O & M Considerations in the construction grants process, this manual outlines procedures in the USEPA Construction Grants Program which should be taken to achieve improved operation and maintenance of wastewater treatment facilities. Contents include lesson plans, references to handout sheets and the use of slides.

17. Document Analysis a. Descriptors
Sewage treatment, waste treatment, waste water, maintenance programs, maintenance engineering, instructions, guides, manuals.

b. Identifiers/Open-Ended Terms
N/A

c. COSATI Field/Group 13B

18. Availability Statement: Release Unlimited

19. Security Class (This Report) Unclassified

20. Security Class (This Page) Unclassified

21. No. of Pages 446

22. Price

(See ANSI–Z39.18)

See Instructions on Reverse

OPTIONAL FORM 272 (4–77)
(Formerly NTIS–35)
Department of Commerce

National Training
and Operational
Technology Center
Cincinnati OH 45268

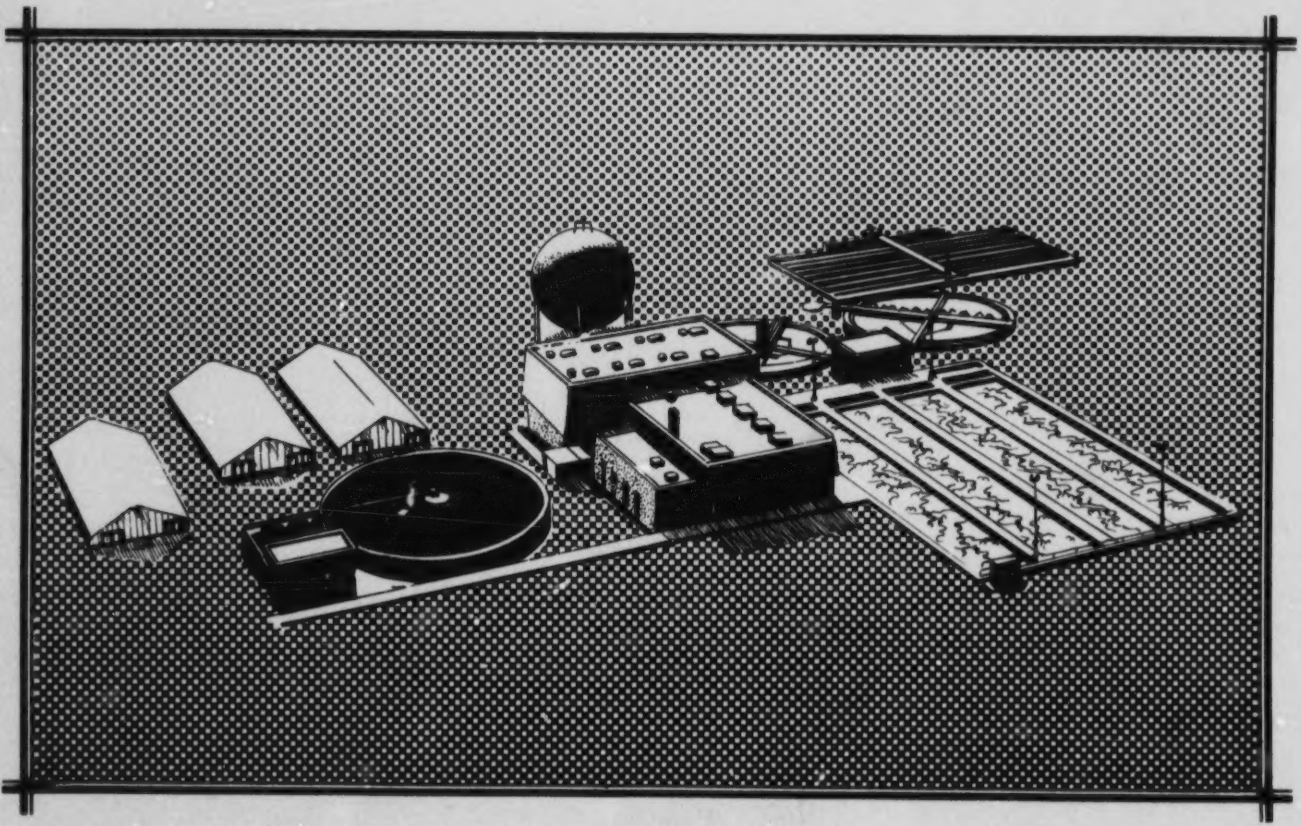
EPA-430/1-80-003

PB82-111717

EPA

O&M Considerations In The Construction Grants Process

Instructor's Manual



REPRODUCED BY
NATIONAL TECHNICAL
INFORMATION SERVICE
U.S. DEPARTMENT OF COMMERCE
SPRINGFIELD, VA 22161

O&M CONSIDERATIONS IN THE CONSTRUCTION GRANTS PROCESS

Instructor's Manual

Prepared for:

Environmental Protection Agency
Cincinnati, Ohio 45268

Under Training Grant No. T-901-051-010

by

Water/Wastewater Training Division
Texas Engineering Extension Service
The Texas A&M University System
College Station, Texas 77843

DISCLAIMER

This manual has been reviewed by the National Training and Operation Technology Center, the Municipal Operations Branch of the Construction Grants Division, and regional staff personnel, U.S. Environmental Protection Agency, and approved for publication. Approval does not signify that the contents reflect the views and policies of the U.S. Environmental Protection Agency. The mention of trade names or commercial products in this publication is for illustration purposes and does not constitute endorsement or recommendation for use by the Texas Engineering Extension Service, The Texas A&M University System, or the U.S. Environmental Protection Agency.

ACKNOWLEDGEMENTS

This handbook was a comprehensive development effort involving the contributions of the following people:

Texas Engineering Extension Service

James R. Bradley, Director

Water and Wastewater Training Division

Clark Benson, Head
Project Director

Leon Holbert
Consultant

Dan D. Siebeneicher
Technical Writer

Catherine L. Mieth
Typist

Instructional Programs Services

Steve Shiller, Head

Al Posey
Barbara Sexton
Publications

Elaine Merrifield
Bonnie Wilkinson
Editors

Vickie Clakley
Debbie Marsh
Word Processors

Lori Grassman
Artist

Vocational Industrial Teacher Education Division

Dr. M. Doyle Butler, Head

Daniel N. Gray, Coordinator
Instructional Materials Services

Toni M. Dean
Instructional Materials Specialist

William E. Medcalf
Instructional Materials Specialist

Stephen E. Presnal
Audio Visual Specialist

Special appreciation is extended to Charles R. Feldmann, USEPA Project Officer, and the staff of the USEPA National Training and Operational Technology Center, Cincinnati, Ohio. 45268

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INTRODUCTION

The Water Production Control Act (P.L. 84-660) was passed by Congress in 1956, and amended in 1972 (P.L. 92-500). In 1977 the Clean Water Act (P.L. 92-217) was passed. These laws provide for extensive involvement and support by the federal government in local, state and area-wide wastewater treatment systems. The Environmental Protection Agency (EPA) has the responsibility of implementing these laws.

Over the past 25 years about 20 billion dollars in federally funded construction grants programs have been spent to build new wastewater treatment facilities. It is estimated that nearly 50 percent of these facilities are not meeting their original design objectives. This continuing trend of poor performance must be corrected if point source pollution is to be controlled.

A variety of factors contribute to this trend of poor performance. This course of study: (1) addresses these factors, (2) describes specific steps that must be followed by EPA and stage agency personnel throughout the technical and procedural review process, and (3) provides the necessary guidelines for increasing EPA and the state agency's effectiveness in implementing O&M concerns in the Construction Grants Process.

FOREWORD

The Instructor's Manual is designed as a guide for the instructor's of the 3 1/2 day training course entitled, "O&M Considerations in the Construction Grants Process."

This training program has been developed for state agency and EPA review personnel who are assuming or have assumed delegated responsibility for the construction grants program. It will focus on the inclusion of operational considerations throughout the technical and procedural review process of a treatment facility construction project.

This guide is to be used by the instructor as a curriculum guide in the presentation of lessons which will provide EPA and state agency personnel with specific tools and guidelines that will increase their effectiveness in implementing O&M concerns through the construction grants activity.

In addition to this manual is the associated Participant Handbook, titled O&M Considerations In The Construction Grants Process (EPA-430/1-80-002 May 1980), which is provided each participant to facilitate understanding of materials covered in the workshop and to be used as a reference following completion of the workshop. Related visual material, handouts, and participant exercies are also included in the course package.

USE OF INSTRUCTOR' MANUAL

Layout of Manual

Units

The Instructor's Manual is divided into six units which correlate to those in the Participant Handbook, O&M Considerations In the Construction Grants Process EPA430/1-8-017 and each unit contains a variable number of lessons. For ease of access, a Contents section is included at the front of the manual. All lesson titles are listed in this section. Preceding this section is a list of the unit titles.

Preceding each unit is a presentation of the performance objectives for that unit. These objectives specify what the participant will be able to do upon completion of the unit.

Lesson Plans

The purpose of the lesson plan is to provide an outline of information for use by the instructor. These plans can be modified as desired to meet the individual instructor's needs. The lesson plan forms the basic framework of the lesson itself.

Each lesson plan is divided into sections, each having a particular purpose, to assist the instructor in preparing for the lesson, presenting the lesson, and evaluating the instruction of the lesson. (The lesson plans for work sessions are written in terms of direction to the instructor for conducting the workshop.)

Knowledge of the following sections will be helpful in conducting a workshop.

The first section identifies the lesson by:

1. Course title

2. Unit number

3. Subject title
4. Lesson number and title

The second section contains:

1. A list of materials needed to present the lesson
2. Reference identification to the Participant Handbook

Following the third section will be the four stages of the lesson:

1. Lesson Introduction: The introductory statement(s) which motivate the participant and lays the foundation for the information or skill to follow.
2. Lesson Presentation: The stage which provides basic information or key points relevent to the lesson topic. The basic steps in the lesson are presented on the left hand side of the page while key points are enumerated on the right side of the page.
3. Application/Verification: The stage that allows the participant to apply the skill or information presented and/or verifies if the participant has acquired the skill or information.
4. Summary: The statement(s) which provide (a) an overview of key points in the lesson (b) closure, and (c) a "tying-in" of information in the following lessons.

Use of Lessons

A key to the use of visuals and information sheets is provided. The instructor must be familiar with this key in order to use visual aides and information sheets effectively and appropriately. The O/H notation indicates the use of a transparency on overhead projector; I.S. indicates the use of related information sheets. Special emphasis (i.e., safety precautions, etc.) is referenced by the word "Note". These notations (O/H, I.S. and Note) appear on the left side of the page, mainly in the presentation stage of the lesson but also in the other stages.

Participant Activities

Included in the Instructor's Manual are various participant activities. Examples of these activities are:

1. A pre-evaluation to assesss the participant's knowledge of the construction grants program
2. Ongoing class discussion relevant to lesson presentations
3. Case Histories of the Step 1 process
4. Participation in a preapplication conference
5. Case-study review of a:
    a. Plan of operation
    b. Start-up service proposal
6. Exercises to:
    a. Improve O&M communication
    b. Simplify sentence structure

GUIDE TO INSTRUCTING

Four Stage Lesson Plan

This course is designed to be presented by utilizing the four stage plan of instruction. This plan includes four basic steps of instruction:

1. Preparation
2. Presentation
3. Application/Verification
4 Summary

Each lesson contains a preparation section to guide the instructor in motivating the participants. This section can be expanded upon or otherwise altered to suit the needs of the specific workshop. The preparation stage prepares the participant for the lesson. It can involve: stating the general subject of the lesson, relating the lesson to preceding or succeeding lessons, explaining the objective of the lesson (i.e., what the participant will know or be able to do upon completion of the lesson), explaining why the information is important and how it will be used, and asking questions to determine the participants' knowledge of the lesson and to arouse their interest.

The presentation stage involves presenting relevant information to the participant. A combination of teaching methods, materials, and aids have been used in the prepared lesson plans. These should be followed as closely as possible. Basic rules to be followed in the presentation stage include:

1. Stress key points
2. Teach short segments of information
3. Use simple language
4. Explain, define, and pronounce new terms
5. Ask questions to increase participant participation and understanding of each step or topic; state reasons for procedures or processes

The instructor must provide opportunities throughout the lesson for participants to apply what they are learning and/or to verify what skills or information the participants have acquired. The application/verification stage provides these opportunities by allowing the participant to "try-out" the performance or give back the information (either formally or informally). It's the instructor's responsibility to evaluate the participant's learning on an ongoing basis. This stage involves:

1. Participant performance of the task or application of the information
2. Supervision of performance; checking performance frequently
3. The use of questions (the instructor stops periodically to check on the participant's understanding of specific concepts or ideas) or written exercise
4. Repetition of the presentation if necessary
5. Direction of participants to teach other participants
6. Immediate correction of errors or omissions (i.e., corrective feedback), (compliment before you correct)
7. Avoidance of crificism
8. Participants to correct their own errors when possible
9. Continued applications until the participant knows the information/skill

Some basic rules of the application/verification stage are to:

1. Avoid correction in front of others
2. Encourage the participant to apply the knowledge or practice the skill
3. Encourage questions
4. Give immediate feedback as appropriate

A brief summary is presented in each of the lesson plans. This summary can be modified to meet the individual instructor's needs. The summary stage provides an opportunity for review of important points in the lesson. The instructor can have the participant summarize important procedural steps or emphasize points.

Instructional Aids

Each lesson utilize instructions aids. Effective utilization of these aids will enhance class presentations and facilitate learning.

The use of the Participant Handbook, slides, transparencies, and information sheets are integrated throughout the workshop.

Participant Handbook

Each participant will be given a Participant Handbook. This handbook is designed:

1. To supplement workshop activities
2. To facilitate understanding of materials covered in the workshops
3. As a post workshop reference
4. As a guide for the preparation of O&M manuals

Units in the participant Handbook correlate to those in the Instructor's Manual. Reference to the handbook during class presentations will facilitate learning and aid the participant in becoming familiar with the primary workshop reference.

Slides and Transparencies

Slides and transparencies provide an excellent medium for improving communication. Used appropriately, they promote attention, create interest, center attention on the teaching topic, emphasize important concepts, utilize several physical senses and increase understanding. Both slides and transparencies are used to introduce and/or summarize topics and emphasize points.

Information Sheets

Information sheets (in the form of class handouts) provide added instruction in specific areas. These information sheets are used in the lessons to:

1. Present new information not presented in the basic references used in the workshop.
2. Enlarge upon formation not fully covered in basic references.
3. Condense information covered too fully for a particular use.
4. Consolidate various items of information collected from several sources.
5. Adapt printed information to the level of the participant.
6. Make specific applications or to make analogies of items of information.

Projection Equipment

Projection equipment should be set up and checked for performance prior to class. Spare bulbs, extension cords, and electrical adaptors should be readily available.

The instructor must be familiar with and able to efficiently operate an overhead projector and slide projector.

It is important to control projection time on individual slides and transparencies. The projector should be turned off during periods of extended instruction or discussion. This directs the attention of the participants to the instructor rather than dividing it between the screen and the instructor.

COURSE INTRODUCTION

UNIT
1

U1

UNIT ONE

OBJECTIVES

Following the Unit One presentation, the participant will be able to:

1. Identify those agencies or groups concerned with pollution control and describe their activities in this area
2. Discuss O&M requirements as defined by:
   a. Regulations
   b. Guidelines
   c. Program requirements memoranda
3. Demonstrate the use of O&M checklists

COURSE:	O&M CONSIDERATIONS IN THE CONSTRUCTION GRANTS PROCESS
UNIT:	ONE
SUBJECT:	COURSE INTRODUCTION
LESSON 1:	PRECLASS ACTIVITIES

MATERIALS:

Transparency (No. 1)
Overhead projector, screen

For each participant:
Name card, felt pen
Registration form
Course agenda
Participant Handbook
Course evaluation form

PERFORMANCE OBJECTIVES:

The participant will be able to:

1. Participate in preclass activities.
2. Identify activities on the course agenda.
3. Recognize and explain the purpose of the Participant Handbook.

LESSON INTRODUCTION:

(Instructor print name and course title on chalkboard.)
(Introduce self verbally to class.)
(Distribute registration forms. Have participants fill out. Talk participant through form. Caution not to get ahead. Check forms for completeness and accuracy.)

I Want to welcome you to ________________________. Have you been here before? I hope your visit will be pleasant and if we can assist you in any way please let us know.

You probably have some ideas about this course, but at the same time you are wondering about what will be expected. In this lesson, you will learn what is expected of you and what you may expect to learn.

However, if we are to work together, we need to become better acquainted. As our first order of business, let's prepare our name cards.
(Distribute name cards and different colored felt pens. This will aid in dividing class into work groups later. Instruct on making cards. Have participants make them.)

LESSON PRESENTATION:

A. Participant Introductions	1. (Have each participant stand and give the following information:) A. Name B. Employer C. Type of work D. Years experience E. Interest and hobbies 2. (Continue until all are introduced) 3. (Comment appropriately on introductions as made)
B. Instructor's Background	1. (Give information as stated above) 2. (Past teaching experience) 3. (Don't try to over impress them)
C. Course Agenda	1. (Distribute copies of agenda and briefly explain each activity) 2. (Discuss schedule)
D. Participant Handbook (Note)	1. (Distribute a handbook to each participant) 2. Purpose of handbook: (Refer to "Forward", page ii) A. To facilitate understanding of materials covered in class B. As a reference following completion of course C. As a handbook for the course D. As a guide for the review of O&M manuals 3. Information in handbook is of primary importance to individuals involved in reviewing and approving:

D. Participant Handbook (CONT'D)	A. Facility plans B. Plans and specifications C. O&M manuals D. Start-up services E. Plan of operation
E. Course Evaluation Forms	1. (Distribute forms) 2. Purpose of form: A. Forms are for EPA B. EPA uses forms to monitor the effectiveness of course 3. Use of forms: A. As each topic is presented each participant will make an evaluation B. Forms are returned at end of course
F. Regional O&M Personnel	1. (Introduce Regional O&M Specialist) 2. (Specialist will discuss region O&M policies with participants)

APPLICATION:

What questions do you have concerning the agenda?

Do you have any questions concerning the purpose of the Participant Handbook?

SUMMARY:

We have now become acquainted. We have discussed the course agenda and regional O&M policies.

Next we will discuss the reason or background information for the course.

COURSE: O&M CONSIDERATIONS IN THE CONSTRUCTION GRANTS PROCESS
UNIT: ONE
SUBJECT: COURSE INTRODUCTION
LESSON 2: HISTORICAL OVERVIEW

MATERIALS:

Slide projector, screen
Slide set A: slides 1-7

REFERENCE: Participant Handbook, pages 1-4 to 1-5

PERFORMANCE OBJECTIVES:

The participant will be able to:

1. State the purpose of the course.
2. Identify those agencies or groups concerned with the prevention of water pollution and describe actions taken to control point source pollution.

LESSON INTRODUCTION:

In an effort to reduce and possibly eliminate pollution of the nation's water, Congress has enacted legislation designed to aid in solving the water pollution problems.

There are many groups involved in the effort to control point source pollution.

We will discuss these groups at this time.

LESSON PRESENTATION

A. Prevention of Water Pollution

1. Legislation

    A. Water Pollution Act in 1956
    P.L. 84-660

    B. Amendment in 1972
    P.L. 92-500

    C. Clean Water Act of 1977
    P.L. 95-217

A. Prevention of Water Pollution (CONT'D)	2. Funding A. Construction of wastewater treatment facilities B. Sewage collection C. Sewer system rehabilitation
(Note)	Over the past 25 years about $20 billion in federally funded construction grant programs have been spent to build new wastewater treatment facilities
	3. Environmental Protection Agency A. Created by Congress in 1970 B. Program function - Review and approval of: 1. Facility plans 2. Plans and specifications 3. O&M manuals 4. Permit programs 5. Start-up procedure 6. All functions dealing with the construction grants process 4. Active citizens' group A. Talk shows B. Townhall meetings C. Letter-writing campaigns
B. Problems	1. Results have been disappointing A. Almost half of the newly constructed facilities are not operating according to the design objectives B. More than half of older plants are not meeting their discharge permits 2. This continuing trend of poor performance is of great concern

B. Problems (CONT'D)

A. The construction grant program goal is to reverse this trend by controlling point source pollution

B. In this course, we will address several actions that can be taken to reverse this poor performance

C. There are other courses available to help those states who have accepted delegation under section 205(g) of the Clean Water Act

APPLICATION:

Group discussion during presentation.

Oral questions.

SUMMARY:

(Project slides A: 1-7.)
(Summarize and discuss with participants as appropriate.)

Legislation groups, the Environmental Protection Agency, and several citizens' groups are concerned with the prevention of water pollution.

Some of the factors that have contributed to this problem will be addressed and specific steps that must be taken to improve operation and maintenance will be discussed during the workshop.

COURSE: O&M CONSIDERATIONS IN THE CONSTRUCTION GRANTS PROCESS
UNIT: ONE
SUBJECT: COURSE INTRODUCTION
LESSON 3: PRETEST

MATERIALS:

Pretest (I.S.-01) for each participant

NOTE TO THE INSTRUCTOR:

Each workshop participant will be given a pretest. The purpose of this pretest is to assess the knowledge level of each participant in regard to the subject matter covered in the course. The pretest will enable the instructor to tailor the course to the needs of the class. In addition, it will help the participants to understand their personal need for the course and will indicate prospective areas of study.

HOW TO ADMINISTER THE PRETEST:

1. Set the participants at ease.
2. Explain the purpose and use of the exercise.
3. Provide each participant with a pretest (I.S.-01).
4. Review the pretest with the participants and answer any questions.

COURSE: O&M CONSIDERATIONS IN THE CONSTRUCTION GRANTS PROCESS
UNIT: ONE
SUBJECT: COURSE INTRODUCTION
LESSON 4: O&M REQUIREMENTS

MATERIALS:

Overhead projector, screen
Slide projector
Transparencies 2-7
Slide set A: slides 7-15

REFERENCE: Participant Handbook, pages 1-6 to 1-7

PERFORMANCE OBJECTIVE:

The participant will be able to identify and explain the operation and maintenance requirements in the construction grants process.

LESSON INTRODUCTION:

Proper operation and maintenance of federally funded facilities is a long-standing program requirement which can be found in the statutes, regulations, guidelines, and program requirement memoranda.

What are the O&M requirements?

What happens if these requirements are not properly met?

In this discussion these and other questions will be answered.

LESSON PRESENTATION:

A. Law Requirements (O/H-2)	1. No grant shall be awarded unless the applicant has made provisions for operation and maintenance 2. Employment of trained operators ensures proper operation and maintenance
(Note)	Must be carried out in accordance with a state approved plan of operation

A. Law Requirements (CONT'D)	
(Note)	The O&M requirements applies to all grant fundable facilities i.e.: pumping station forced-main sewers, interceptor sewers
B. Code of Federal Regulations (CFR) Requirements	1. Grantee must operate and maintain the treatment works and sewer collection systems
	A. Properly
	B. Efficiently
	2. Development of an O&M manual
	3. Emergency readiness
	4. Operational reports
	5. Adequate O&M budgeting
	6. Laboratory testing facilities
C. Failure to Fulfill All Requirements	1. May cause grant to be revoked
(O/H-3)	2. Grantee may be liable for federaly funds spent
	3. Causes poor plant performance and failure to meet permit requirements
(Note)	Both the state and grantee are charged with proper O&M
(Note)	State is responsible for evaluation program and grantee with proper O&M of facility
D. Guidelines	1. Purposes
	A. To ensure that proper O&M procedures will be followed
	B. To be a helpful tool to those agencies involved in the program

D. Guidelines (CONT'D)	C. To provide helpful technical information and instructions for a successful program
(O/H-4)	2. Stress: A. Reliability B. Operability C. Flexibility D. Maintainability 3. Address: A. Inspection B. Staffing and training C. Adequate laboratory control and records D. Safety E. Maintenance management programs F. Financial responsibility
(Note)	May be updated as new and proven technical data is developed
E. Program Requirements Memoranda (PRM)	1. Purposes
(O/H-5)	A. To ensure national uniformity B. To inform program personnel of policy direction in integrating the requirements of the program
(O/H-6)	2. Mainly concerned with PRM 77-2 and PRM 77-3 A. Provide information on grant eligibility of: 1) Start-up services 2) A plan of operation

E. Program Requirements Memoranda (PRM) (CONT'D)

B. Assures that the municipal treatment works will achieve operational objectives

   1) Quickly

   2) Effectively

C. Plan of operation should identify specific action and completion dates of such actions

D. Start-up services should help achieve operational efficiency

(Note)

PRM's may be updated or replaced

F. Regional Policy and Memorandum

(O/H-7)

1. Purposes

   A. To assure regional uniformity

   B. To inform program personnel of policy direction on the regional level

2. Pollution problems in each region may differ

3. Condition in each region may differ due to the:

   A. Climate

   B. Geology

   C. Social/economic conditions

   D. Topography

(Note)

Regional policy may be updated or replaced

APPLICATION:

Group discussion during presentation.

Oral questions from participants.

SUMMARY:

(Project slides A: 7-15.)
(Summarize and discuss with participants as appropriate.)

Any individual or agency involved in the construction grants program review process should be aware of the O&M requirements as defined by the statutes, regulations, guidelines, and PRM's.

These requirements should be updated as new technical data and on-the-job experience is acquired.

COURSE: O&M CONSIDERATIONS IN THE CONSTRUCTION GRANTS PROCESS
UNIT: ONE
SUBJECT: CONSTRUCTION GRANTS PROGRAM OVERVIEW
LESSON 5: O&M CHECKLIST

MATERIALS:

Slide projector, screen
Slide set A: slides 15-22

REFERENCE: Participant Handbook, pages 1-8 to 1-9

PERFORMANCE OBJECTIVES:

The participant will be able to identify and explain the importance, functions, and benefits of a checklist.

LESSON INTRODUCTION:

A checklist may be defined as: Items listed together for the convenience of comparison or to ensure that all necessary items are included.

Checklists have a universal function. We find them at home, work, and even play.

Using a checklist for grocery shopping is a good example of a checklist. Have you ever forgotten something you needed because you did not have a written list?

(Give personal example)

A checklist is not meant to take the place of common sense and judgement.

A good usable checklist is an important tool in the review process of the construction grants program.

LESSON PRESENTATION:	
A. Need	1. To document coverage of all required material during a conference
(Note)	Can also be used to prove something was not covered

A. Need (CONT'D)	2. Utilized during the review of application stage
B. Functions	1. To ensure that all required items have been received 2. To know when and where required items need to be discussed
C. Benefits	1. As a reviewing agent, to be assured that all requirements are met 2. Proof of compliance or noncompliance is provided 3. Not responsible for remembering everything 4. Applicants know exactly what is required of them
D. Use of Checklist	1. Checklists are in the appropriate units of Participant Handbook 2. Use of each checklist will be explained after each appropriate unit 3. (Show example from handbook)

SUMMARY:

(Project slides A: 15-22.)
(Summarize and discuss with participants as appropriate.)

A checklist is intended to be used as a tool to help the reviewer conduct a quality review. It does not replace judgement and common sense.

A checklist indicates what has and has not been submitted.

The use of a checklist is an invaluable aid to the reviewer.

COURSE: O&M CONSIDERATIONS IN THE CONSTRUCTION GRANTS PROCESS
UNIT: ONE
SUBJECT: CONSTRUCTION GRANTS PROGRAM OVERVIEW
LESSON 6: CONSTRUCTION GRANTS PROCESS REVIEW

MATERIALS:

Overhead projector, screen	Transparencies 8-12
Slide projector	Slide set A: slides 22-29

REFERENCE: Participant Handbook, pages 1-10 to 1-12

PERFORMANCE OBJECTIVE:

The participant will be able to briefly identify and describe the three steps of the construction grants program.

LESSON INTRODUCTION:

In this unit we have discussed the conditions resulting from inferior wastewater collection and treatment, the agencies or groups concerned with pollution control, and O&M requirements as defined by the law, regulations, guidelines, and program requirements memoranda.

Now we will identify and briefly describe the three steps of the Construction Grants Process.

LESSON PRESENTATION:

A. Three Steps of Program (O/H-8)	1. Construction grants program is divided into three independent steps A. Planning step B. Design phase C. Construction Phase
(Note)	Each step closely related to each of the other steps 2. In absence of one step - cannot progress to the next step

A. Three Steps of Program (CONT'D)	3. Approval of one step does not assure approval of acceptance of the next step
B. Step 1 (O/H-9)	1. Planning step 2. Begins with a plan of study which outlines the work to be done in preparing a facility plan 3. Preapplication conference explains the program and its requirements 4. Application is submitted for approval 5. After the grant is awarded a facility plan is developed
C. Step 2 (O/H-10) (Note)	1. Applicant proceeds to Step 2 following approval of Step 1 2. Design phase A. Plans and specifications B. Preliminary plan of operation Approval of Step 1 does not obligate EPA to fund Step 2 or Step 3 3. Before Step 2 is approved, all O&M program requirements must be met
D. Step 3	1. Construction phase 2. Construction may begin after approval from the state and/or EPA 3. During construction, inspections are made to ensure: A. Proper construction of plants in accordance with plans and specifications

D. Step 3 (CONT'D)		
		B. Safety and storage of materials
	(O/H-11)	4. During Step 3, the following should be submitted and approved:
		A. Final plan of operation
		B. O&M manual
		C. User charge
		D. Industrial cost recovery
	(Note)	It appears that ICR provisions will be repealed
		E. Sewer use ordinances
		F. Start-up services
		G. Pretreatment program
		H. Sewer rehabilitation
		5. Final payment
		A. A final inspection is required prior to final payment
		B. After payment is made a final audit is conducted
	(Note)	Step 3 is concluded when all of the above is completed and in compliance
	(Note)	It is desirable that the same reviewer attend all 3 conferences
E. Followup		1. It is required after Step 3
		2. Purposes
	(O/H-12)	A. To periodically inspect treatment works for evidence of compliance with permit requirements
		B. To evaluate procedures

E. Followup (CONT'D)	3. If plant is not in compliance then enforcement action may be taken
(Note)	State is responsible for periodic inspection of wastewater treatment plant

APPLICATION:

(Group discussion during presentation.)

SUMMARY:

(Project slides A: 22-29.)
(Summarize and discuss with participants as appropriate.)

The construction grants program addresses operation and maintenance considerations. Inadequate consideration of O&M has occurred in the past.

It is important to understand and implement the operational (O&M) program requirements beginning at the preapplication conference as well as throughout the three-step construction grants process and during the useful life of the facility.

To develop an understanding of these considerations requires periodic training.

O&M
CONSIDERATIONS
STEP 1
CONSTRUCTION GRANTS PROCESS

UNIT
2

U2

UNIT TWO

OBJECTIVES

Following the Unit Two presentation, the participant will be able to:

1. Identify and discuss Step 1 of the Construction Grants Process.
2. Explain the importance of operation and maintenance requirements in Step 1 of the Construction Grants Process.
3. Determine and discuss where operation and maintenance must be stressed in three specific phases prior to Step 1 of the Construction Grants Process:
    a. Preapplication Conference
    b. Plan of Study
    c. Facility Plan
4. Recognize and discuss possible problems if operation and maintenance is not considered in Step 1 of the Construction Grants Process and explain how these problems can be avoided.
5. Utilize the Preapplication O&M Consideration Checklist, Plan of Study Review Operation Checklist, and the Facility Plan Review Operation Checklist when conducting an operation review.

COURSE: O&M CONSIDERATIONS IN THE CONSTRUCTION GRANTS PROCESS
UNIT: TWO
SUBJECT: O&M CONSIDERATIONS IN STEP 1 OF THE CONSTRUCTION GRANTS PROCESS
LESSON 1: OVERVIEW OF THE STEP 1 PROCESS

MATERIALS:

Slide projector, screen
Slide set A: slides 29-34

REFERENCE: Participant Handbook, pages 2-4 to 2-11

PERFORMANCE OBJECTIVES:

The participant will be able to:

1. Identify and describe the phases in Step 1 of the Construction Grants Process.
2. Describe the considerations for ranking projects for funding of construction grants.
3. Identify and evaluate alternative solutions to the water pollution problems.

LESSON INTRODUCTION:

In Step 1 of the Construction Grants Process we recognize the problem of water pollution and develop methods to attack the problems.

At this time let's discuss the phases in the Step 1 process:

State Planning Process
State Priority System
Preapplication Conference
Grant Application Documents
Facility Plan

LESSON PRESENTATION:

A. State Planning Process

1. Required by Public Law 92-500
2. Must be reviewed and approved:

A. State Planning Process (CONT'D)	A. Periodically
	B. By EPA
	3. Must be consistent with the law
	4. Must include
	A. River basin plans or waste load allocation plan
	B. Area-wide waste treatment management plans
(Note)	Commonly known as 208 plans
	5. River basin plans establish the water quality standards for each segment or body of water within the river basin
	A. Stream segment classification
	1) "Effluent limited" 2) "Water quality limited"
	B. First O&M "red flag"
	6. Areawide waste treatment management plans
	A. Usually prepared for urban-industrial areas
	B. For water quality control due to a concentration of people and industries
(Note)	Should be more cost-effective and attract better qualified operators
B. State Priority System	1. Each state is allotted a sum of money annually for construction grants
	2. State develops a system of ranking project for funding considering:
	A. The severity of pollution problems

B. State Priority System (CONT'D)	B. The existing population affected
	C. The need for preserving high quality water
	D. National priorities
	E. Any additional factors considered significant by the state
	3. Public hearing
	A. Provides prospective grantees with information
	B. State officials emphasize the necessity of considering O&M in their plan of operation
(Note)	Monies for proper O&M must be budgeted by the grantee
C. Preapplication Conference	1. Encouraged by federal regulations but optional
	2. For applicant and state and regional EPA representatives
(Note)	Set the stage for a good working relationship
	3. Topics to be discussed
	A. All three steps in the grants process
	B. Contracts for personal and professional services
	C. Administrative requirements
	D. Technical requirements
	E. O&M considerations
	F. Selection of A/E firm
	4. Offers opportunity for officials to stress that good planning, design, and construction is of little value if O&M considerations are neglected

D. Grant Application Documents

1. Clearinghouse review

   A. Provides for early contact between applicants and all interested governmental agencies

   B. Copies of comments must be included in the application package

2. Plan of study

   A. Outlines the work involved in preparation of a facility plan

   B. Submitted by the applicant

(Note)

This is the first element of the grant request

3. EPA Application Form 5700-32

   A. Is the formal application document

   B. Must contain:

      1) Name, project number, and project description
      2) Amount of grant request
      3) Copy of authorizing resolution
      4) Location of project, entities involved, and cost data

4. State priority certification certifies that the applicant is on the state priority list

5. Selection of a professional engineer

   A. Advertising for an engineer is required by regulation

(Note)

Exception: Does not apply to communities with population under 25,000

D. Grant Application Documents (CONT'D)	B. Same engineer may be used in all three steps or may use different engineer in each step
E. Facility Plan (Note)	1. Effluent limitations A. Set by the National Pollution Discharge Elimination System (NPDES) NPDES established by Public Law 92-500 B. Set limits on biochemical oxygen demand (BOD) and suspended solids that may be discharged into a stream C. Vary according to the nature of the receiving stream D. Determine the type of treatment works and the operational efficiency required 2. Must investigate and evaluate alternative solutions to the water pollution problem A. Improvement of the existing plant B. Most appropriate water treatment management technique 3. Infiltration/inflow analysis A. Infiltration is ground water which leaks into sewers B. Inflow is storm water which enters the sewer C. Inflow is seasonal and may be more easily corrected than infiltration D. Analysis should indicate:

E. Facility Plan (CONT'D)

- 1) Cost of transporting I/I
- 2) Cost of treating I/I
- 3) Cost of removing I/I
- 4) Amount of I/I to be removed
- 5) Need for a sewer system evaluation survey

4. Sewer system evaluation survey

   A. Conducted only if I/I analysis indicates that excess I/I exists

   B. Consists of:

      - 1) A physical survey of the system
      - 2) Smoke bomb or air pressure testing
      - 3) Selected sewer system cleaning
      - 4) Visual inspection of selected sewer sections
      - 5) Preparation of a report

   C. Will identify specific sections of the sewer system to be reparied by:

      - 1) Grouting
      - 2) Sealing
      - 3) Lining
      - 4) Replacing

5. Public input

   A. Allows interests and potential conflicts to be identified early and considered as the planning proceeds

   B. Public hearing should:

      - 1) Define issues
      - 2) Analyze information
      - 3) Explain costs
      - 4) Discuss alternatives
      - 5) Allow all interests to be heard
      - 6) Emphasize O&M costs

   C. Involvement through:

      - 1) Advisory groups
      - 2) Public meetings and hearings

E. Facility Plan (CONT'D)

3) Workshops
4) Mailings
5) Seminars
6) News media
7) Surveys

6. Selected alternative

A. After all investigations and alternatives are evaluated

B. Describe in greater detail

7. Review, certification, and approval

A. Levels of review

1) Clearinghouse
2) State
3) EPA

B. EPA will review for approval only after clearinghouse and state approval

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APPLICATION:

Group discussion with oral questions during the presentation.

SUMMARY:

(Project slides A: 29-34.)
(Summarize and discuss with participants as appropriate.)

Each phase in Step 1 of the Construction Grants Process is important.

We should be aware of and understand the state planning process, the state priority system, the preapplication conference, the clearinghouse review, the plan of study, the approval and certification, the EPA review, the facility plan, and state and EPA review.

COURSE: O&M CONSIDERATIONS IN THE CONSTRUCTION GRANTS PROCESS
UNIT: TWO
SUBJECT: PREAPPLICATION CONFERENCE
LESSON 2: PARTICIPANT WORKSHOP

MATERIALS:

Preapplication Conference Workshop (I.S.-02) information sheet for each participant.

PERFORMANCE OBJECTIVE:

The participant will be able to discuss the role of the grantee, engineer, state official, and/or EPA official in a preapplication conference.

HOW TO CONDUCT THE WORKSHOP:

1. Explain the purpose and objective of the Preapplication Conference Workshop.

2. Divide participants into at least five groups of approximately five people each. Since different colored pens were used to make name cards, the colors can be used as a means of identifying groups. Avoid having a group composed of members from just one area.

(I./S.-02) Provide each participant with an information sheet (Preapplication Conference Workshop, I.S.-02).

3. Allow each group 30 minutes to study and discuss the roles of each participant in a preapplication conference. Encourage group participants to take notes.

4. Assign each group one of the following specific roles to review; grantee, engineer, state official, or EPA official.

5. Allow each group 15 minutes to prepare an oral presentation concerning the role of their assigned person.

6. Have one person from each group identify and discuss the role of their assigned person at a preapplication conference.

7. After each group presentation each of the other groups are to critique the presentation and discuss as appropriate.

BACKGROUND INFORMATION: (Preapplication Conference Workshop)

The city of Noname, Allstate has a population of 20,000. The city presently has an Imhoff tank and a standard rate trickling filter. The wastewater effluent has been exceeding the NPDES permit for over a year. The city is located on a segment of a stream which has been designated as "Water Quality Limited."

The city is on the state priority list. The state has called a preapplication conference. The state official is the moderator. The following persons are present at the conference: (1) grantee, (2) engineer, (3) state official, and (4) EPA official.

COURSE: O&M CONSIDERATIONS IN THE CONSTRUCTION GRANTS PROCESS
UNIT: TWO
SUBJECT: PHASES IN STEP 1 WHERE OPERATION AND MAINTENANCE MUST BE STRESSED
LESSON 3: PREAPPLICATION CONFERENCE

MATERIALS:

Overhead projector, screen	Transparencies 13-17
Slide projector	Slide set A: slides 34-43

REFERENCE: Participant Handbook, pages 2-12 to 2-16

PERFORMANCE OBJECTIVE:

The participant will be able to determine and explain where operation and maintenance must be stressed in the preapplication conference of Step 1 of the Construction Grants Process.

LESSON INTRODUCTION:

Regardless of how well-planned, well-designed, or well-constructed a wastewater treatment plant may be, if it is not operated and maintained by trained personnel, it will not perform at its maximum design capacity.

All wastewater treatment operators, regulatory personnel, and design engineers must be trained to:

1. Recognize the importance of O&M.
2. Implement O&M programs and procedures.

In Step 1, operation and maintenance should be stressed in the preapplication conference, the plan of study, and the facility plan. First of all, we will discuss the preapplication conference.

LESSON PRESENTATION:

A. Introduction	1. Conference should be mandatory 2. Conference is used to emphasize O&M requirements and potential problems

A. Introduction (CONT'D)	3. Goal of conference is to produce a well-coordinated program that avoids pitfalls and delays A. Entire O&M construction grants process should be addressed B. Step 1 program requirements should be emphasized 1) Administrative 2) Technical
B. Location of O&M Requirements	1. Public Law 84-660, section 8(B) 2. Public Law 92-500, section 204(A) (4) 3. 40 Code of Federal Regulations, part 35 4. PRM's
C. Issues to Be Discussed	1. Applicant's past record on previously funded projects 2. Federal expenditures for pollution abatement can be voided for improper operation and maintenance of treatment facility 3. O&M requirements A. Applicant must show that provisions have been made to assure proper O&M of treatment works and sewer system
(O/H-13) (Note)	40 CFR 35.925-10 B. Grantee agrees to complete the treatment works according to approved plans and specifications C. Grantee agrees to maintain and operate the treatment works for its design life

C. Issues to Be Discussed (CONT'D)

(Note)

40 CFR 35.931 (B)

(O/H-14,15,16)

D. 40 CFR 35.935-12

1) Lists documents that are required
2) Describes grantee's responsibilities in regard to O&M
3) Include payment schedule
4) Requires a plan of operation

4. Cost analysis evaluation

5. Documentation of the influent flow and load characteristics

6. Plan of operation

A. Preliminary plan

B. Final plan

C. Program Requirements Memorandum 77-3 describes plan of operation requirements

7. Preparation of an O&M manual

A. Rough draft of the manual is required by the time 50 percent of the Step 3 grant payment is made

B. Final manual is required by the time 90 percent of the Step 3 grant payment is made

8. PRM 77-2 explains that start-up services are grant fundable

9. The responsibilities and liabilities of the grantee, consultant, contractor, EPA, and state as outlined under the following statutes:

A. 40 CFR 35.935-5 Grantee's Responsibilities

B. 40 CFR 35.937 Subagreements for Architectural or Engineering Services

C. 40 CFR 35.938 Construction Contracts (Subagreements) of Grantees

D. Appendix C-1 of 40 CFR Required Provisions Consulting Engineering Agreements

E. Appendix C-2 of 40 CFR Required Provisions Construction Contracts

10. Obligations after construction

A. Grantee to operate and maintain facility properly

(Note)

The O&M budget should include money for operation and maintenance including replacements. It should provide adequate funds for salaries based upon local economy, similiar plants, union, etc.

B. State responsibility for past O&M evaluation inspections

D. Preapplication Conference O&M Considerations for Discussion Checklist

(O/H-17)

1. (Refer to checklist on page 2-33 of Participant Handbook)

A. Becomes faciliar with checklist

B. Utilize checklist when conducting a preapplication conference

C. Checklist contains the O&M concerns that must be considered during the Step 1 process

2. Review the 40 CFR cited in the checklist

APPLICATION:

Group discussion with oral questions during the presentation.

SUMMARY:

(Project slides A: 34-43.)
(Summarize and discuss with participants as appropriate.)

The goal of the preapplication conference is to produce a well-coordinated program that will avoid pitfalls and delays.

The entire operation and maintenance construction grants process should be addressed.

Use of the preapplication conference O&M considerations for discussion will ensure that the O&M concerns for the construction grants process are covered at the preapplication conference.

COURSE: O&M CONSIDERATIONS IN THE CONSTRUCTION GRANTS PROCESS
UNIT: TWO
SUBJECT: PHASES IN STEP 1 WHERE OPERATION AND MAINTENANCE MUST BE STRESSED
LESSON 4: PLAN OF STUDY

MATERIALS:

Overhead projector, screen	Transparency 18
Slide projector	Slide set A: slides 43-47

REFERENCE: Participant Handbook, pages 2-16 to 2-19

PERFORMANCE OBJECTIVE:

The participant will be able to identify and discuss where operation and maintenance must be stressed in the plan of study in Step 1 of the Construction Grants Process.

LESSON INTRODUCTION:

The plan of study is the most important element of the three-step Construction Grants Program.

The plan of study is the first element in a request for grant assistance in preparing a facility plan.

It is not a facility plan, but rather it lists the required tasks to be accomplished in preparing a facility plan.

LESSON PRESENTATION:	
A. Importance	1. Lays the groundwork for the facility plan 2. Assures that the applicant will complete the facility plan in accordance with all laws and regulations
(Note)	Plan of study is not grant fundable
B. Contents	1. Description of the proposed planning area (including maps)

B. Contents (CONT'D)	2. Identification of the entity or entities that will conduct the planning 3. Statement of the nature and scope of the proposed Step 1 project 4. Taks, schedule, and costs 5. Any significant public comments
C. Description of Planning Area	1. Size 2. Type 3. Population 4. Governmental entities
D. Entity or Entities	1. Conduct the planning 2. Affect O&M requirements 3. Their O&M performance at existing facilities should be investigated
(Note)	Past performance often indicates future performance
E. Nature and Scope of Project	1. Includes schedule for completion of specified tasks 2. Includes itemized cost estimate of planning the project 3. Each task listed needs to be evaluated in terms of O&M program requirements and O&M cost
F. Applicant's Considerations	1. Proper and efficient O&M of the existing plant 2. O&M costs 3. Public notification of O&M costs

F. Applicant's Considerations (CONT'D)	4. O&M costs as reflected in preliminary design cost estimate 5. Development of a preliminary O&M manual 6. O&M funding with user charge 7. Development of start-up services 8. Development of a plan of operation
(Note)	The reviewing agency should ensure that these O&M concerns have been considered
G. Infiltration and Inflow Data	1. Written certification if there is not a problem 2. Detailed sewer evaluation is needed if there is a problem
H. Approval or Disposal of Plan	1. By reviewing agency 2. If approved, and a grant offer is accepted, the applicant may begin to develop the facility plan
I. Plan of Study Review Operation Checklit (O/H-18)	1. (Refer to checklist on page 2-35 of Participant Handbook) A. Become familiar with checklist B. Utilize the checklist when conducting a plan of study operation review
(Note)	Checklist can be used for the entire plan of study review C. Checklist contains the O&M concerns that must be considered in the plan of study 2. Review the 40 CFR's cited in the checklist

I. Plan of Study Review Operation Checklist (CONT'D)	3. (Ask for any questions regarding the checklist)

APPLICATION:

(Project slides A: 43-47.)
(Summarize and discuss with participants as appropriate.)

The plan of study must contain the proposed planning area, an identification of entity or entities that will conduct the planning, the nature and scope of the proposed Step 1 project and public participation program, including a schedule for completion of specific tasks, an itemized description of the estimated costs for the project, and any significant public comments.

Use of the Plan of Study Review Operation Checklist will help to ensure that operation and maintenance requirements will not be neglected in the plan of study.

COURSE: O&M CONSIDERATIONS IN THE CONSTRUCTION GRANTS PROCESS
UNIT: TWO
SUBJECT: PHASES IN STEP 1 WHERE OPERATION AND MAINTENANCE MUST BE STRESSED
LESSON 5: FACILITY PLAN

MATERIALS:

Overhead projector, screen	Transparency 19
Slide projector	Slide set A: 47-52

REFERENCE: Participant Handbook, pages 2-19 to 2-27

PERFORMANCE OBJECTIVE:

The participant will be able to identify and discuss where operation and maintenance must be stressed in the facility plan in Step 1 of the Construction Grants Process.

LESSON INTRODUCTION:

A facility plan is begun after the plan of study has been approved and a grant offer has been made and accepted.

As the plan develops, it should be reviewed on an ongoing basis to assure that all operation and maintenance requirements are being met and to allow needed changes to be made.

(Note) 40 CFR 35.917-4(B) allows the reviewer to exercise flexibility in advising grantees on facility plan requirements.

LESSON PRESENTATION:

A. Contents

1. Description of the treatment works
    A. Includes preliminary engineering data
    B. Cost estimates
    C. Completion schedules
2. Description of the complete waste treatment system

A. Contents (CONT'D)	3. Documentation of infiltration and inflow (I/I) 4. An analysis of cost-effectiveness 5. Statement of effluent limitations or NPDES permit 6. Clearinghouse comments 7. Summary of the public hearing 8. Financial statement which verifies that the grantee has the resources to: A. Construct B. Operate C. Maintain the treatment works 9. Proof of compliance with the Civil Rights Act of 1964
B. Requirements of Environmental Assessment	1. Description of the existing environment without the project 2. Projection of the future environment without the project 3. Documentation 4. Evaluation of alternatives 5. Statement of environmental impact 6. Action needed to minimize adverse effects
C. Guidance for Preparing a Facility Plan	1. Published by EPA 2. Includes a suggested format 3. Discusses review procedure
D. Effluent Limitations	1. Determines the type of treatment needed

D. EFFLUENT LIMITATIONS (CONT'D)	2. Indication of the type of plant operation and maintenance required to achieve the allowed effluent
(Note)	Incorrect data may result in a treatment plant requiring O&M beyond capabilities of the applicant
E. Inventory	1. Of wastewater flows and the treatment system 2. Includes: A. Location of all treatment facilities B. Location of all sewer systems C. Description of all facilities D. List of industrial users E. An analysis of peak, low, dry, and wet weather flows F. Diagram of bypasses and overflows G. Program to reduce I/I H. Program of user conservation 3. Purposes A. Furnish data from which future flows will be determined B. Indicates severity of the pollution problem
F. Sewer System Evaluation	1. Consists of an I/I analysis 2. Major components of the existing system are evaluated for possible use in the new project 3. Reviewer must consider: A. Adequacy of treatment plant design for type and amount of flow

F. Sewer System Evaluation (CONT'D)

B. Adequacy of operation and maintenance

C. Effects of I/I

D. Effects of industrial users

4. Projection of future flows and loads

A. Must be developed by the applicant

B. Based upon future land use plans or development patterns and economic and population projection

C. Will determine what degree of treatment is needed to achieve the effluent limitations

(Note)

The more complex the treatment, the more complex the O&M procedure

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G. Alternatives to Correct the Pollution Problem

1. Use of the existing facility

2. A regional approach to wastewater

(Note)

Consider difference in reliability, flexibility, and O&M cost of the regional facilities

3. Following options must be considered:

A. No action

B. Flow and waste reduction

C. Use of existing sewers and interceptors

D. Sludge disposal

E. Best practical waste treatment technology (BPWTT)

(Note)

Many alternatives would be eliminated by investigation of the above

G. Alternatives to Correct the Pollution Problem (CONT'D)

4. After selecting the most feasible alternatives, an evaluation of each is completed in order to select the most cost-effective and environmentally sound project

5. To determine flexibility and reliability of alternatives, the applicant needs to consider:

   A. Future plant expansion and land requirements

   B. Easement and right-of-way for the sewer

   C. Treatment process

   D. Equipment and personnel

H. Public Hearing

1. For imput to help select the most cost-effective and environmentally sound alternative

(Note) Reviewer should obtain a copy of the transcript and review it

2. Preliminary design of the selected treatment works should be reviewed

3. If the facility is properly operated and maintained, can it achieve permit effluent limitations?

4. The more complex the control testing requirements, the more complex the operation and maintenance of a treatment works

5. Documentation that the following were discussed:

   A. Impact of hydraulic, organic, industrial, and inplant return

   B. Pretreatment programs

   C. Influent characteristics

   D. O&M costs per user were discussed during the public hearing

H. Public Hearing (CONT'D)	
(Note)	O&M costs will be more than initial cost for the useful life of plant
	6. Notices A. State cost of operating and maintaining the plant after construction per user B. Name of the funding institution or agency
I. Selection of Plan	1. After evaluation and public hearing a plan is selected 2. A brief summary of the environmental impact is developed 3. Preliminary design of treatment works is prepared 4. Arrangements for implementation and a financial program is developed
(Note)	Documentation to show that the plan is cost-effective and environmentally sound is included
J. Review	1. Preliminary O&M plans require careful review 2. Funding of nonfederal costs should be reviewed 3. User charge, industrial cost recovery, and debt service charges should be considered in the facility plan
(Note)	Funding for proper O&M is dependent upon these charges
	4. Applicant's past record of O&M of existing federally funded facilities (40 CFR 935-1(B))
(Note)	If the grantee is not providing adequate O&M at existing plants, then appropriate action must be taken

J. Review (CONT'D)

5. Summary of comments and recommendations
    A. Prepared by the reviewing agency
    B. For the applicant/and or EPA, state
    C. Should be implemented by the applicant prior to approval of the facility plan or before a Step 2 application is accepted

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K. Facility Plan Review Operation Checklist

(O/H-19)

1. (Refer to checklist on pages 2-36 of Participant Handbook)
    A. Become familiar with the checklist
    B. Utilize the checklist when conducting a facility plan operation review

(Note)

The checklist can be used to determine if grantee has adequately operated and maintained existing federally funded facilities and to tie this in with approval of the Step 2 grant application

    C. Checklist contains the O&M concerns that must be considered in the facility plan

(Note)

Upon the initial review utilizing the checklist, the reviewer should then review the O&M concerns using past experience and training in determining if O&M concerns have been properly considered

2. Become familiar with the 40 CFR's cited in the checklist
3. (Ask for any questions regarding the checklist)

L. Course in Neosha, M:

1. Titled "Review of Facility Plan for State Agency Personnel"

L. Course in Neosha, M: (CONT'D)	2. Developed by the Water and Wastewater Technical School 3. Is a 3-day intensive workshop on facility plan review

APPLICATION:

Group discussion during the presentation.

SUMMARY:

(Project slides A: 47-52.)
(Summarize and discuss with participants as appropriate.)

When planning, designing, and constructing a wastewater treatment plant, proper operation and maintenance considerations must not be neglected.

Everyone involved in the Construction Grants Program must be trained to recognize the importance of operation and maintenance requirements and to implement operation and maintenance procedures in all phases in Step 1.

Use of the operating review checklist will aid in implementing the O&M requirements of Step 1.

COURSE: O&M CONSIDERATIONS IN THE CONSTRUCTION GRANTS PROCESS
UNIT: TWO
SUBJECT: O&M CONSIDERATIONS IN STEP 1 OF THE CONSTRUCTION GRANTS PROCESS
LESSON 6: REVIEW EXERCISE OF FACILITY PLAN FOR MINIMUM LEVEL O&M DETAILS NECESSARY FOR AN ACCEPTABLE FACILITIES PLAN

MATERIALS:

For each participant:
Example of a good 201 Facilities Plan
(James W. McGraw - I.S.-03)
Example of an unacceptable 201 Facilities Plan
(James W. McGraw - I.S.-04)

REFERENCE: Participant Handbook,

NOTE TO INSTRUCTOR:

The purpose of this exercise is to develop and improve the skills necessary to conduct a minimum level O&M detail review of a Facilities Plan using Facility Plan Review Operation Checklist, Handbook, experience, and education

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PERFORMANCE OBJECTIVE:

The participant will be able to:
1. Conduct an O&M review of a failities plan
2. Use Facility Plan Review Operation Checklist

PROCEDURE FOR CONDUCTING PARTICIPANT EXERCISE:

1. Divide participants into groups.
2. Explain purpose of exercise.
3. Provide each participant with example (of unacceptable 201 Facilities Plan I.S.-04).
4. Have participants read I.S.-04 and identify weak or missing O&M details.
5. After groups hve completed exercise, conduct a discussion concerning problem areas.
6. After discussion of I.S.-04 provide each participant with example of an acceptable 201 Facilities Plan (I.S.-03).
7. Review and discuss I.S.-03 as necessary.

(Note) There may be more points for discussion in the two 201 Facilities Plan than stated in this exercise.

POINTS TO EMPHASIZE PRIOR TO WORK SESSION:

1. Actual cost are not important, the Administrative process is.

2. If administration costs are 10-15% of the total cost, they should be added to the user charge.

MAJOR POINTS TO BE EMPHASIZED IN DISCUSSION OF 210 FACILITIES PLAN

3. The plan does not have any money budgeted for training costs in the treatment system.

4. The plan does not have any money budgeted for replacement in the treatment system.

5. No chemical costs are included in the plan for disposal systems.

6. The plan indicates that advalorem taxes can be used to meet user charge requirements.

7. The plan indicates that discounts may be given to large volume users.

8. The plan indicates that a user charge may be established on a % of the water used.

9. The hypothetical user charge system does not share the O&M cost with all users.

COURSE: O&M CONSIDERATIONS IN THE CONSTRUCTION GRANTS PROCESS
UNIT: TWO
SUBJECT: O&M CONSIDERATIONS IN STEP 1 OF THE CONSTRUCTION GRANTS PROCESS
LESSON 7: POSSIBLE PROBLEMS IF O&M IS NOT CONSIDERED IN STEP 1

MATERIALS:

Slide projector, screen
Slide set A: slides 52-59
Step 1 Case Histories (I.S.-05) for each participant

REFERENCE: Participant Handbook, pages 2-28 to 2-32

PERFORMANCE OBJECTIVE:

The participant will be able to recognize and discuss seven possible problems if O&M is not considered in Step 1 of the Construction Grants Process and explain how these problems can be avoided.

LESSON INTRODUCTION:

Proper operation and maintenance may be overlooked when building a wastewater treatment facility.

Lack of O&M concerns has created many O&M problems for the operator.

What problems could develop if O&M is not considered in Step 1?

Major problems we are going to discuss today are:

1. Inadequate funding for O&M
2. Inadequate training for operators
3. Inadequate laboratory facilities
4. Nonexistent maintenance management program
5. Useless O&M manuals
6. Inflexibility in the system
7. Staffing difficulties

LESSON PRESENTATION:	
A. Inadequate Funding for O&M	1. Major problem

A. Inadequate Funding for O&M (CONT'D)	2. Applicant must make provisions for sufficient funding to meet program requirements for O&M funding A. These requirements call for proper and efficient O&M of the completed waste treatment facility B. A user charge system must be developed
B. Inadequate Training for Operators	1. The utility owners "must provide well-qualified, well-trained, properly certified, and adequately compensated people to operate the system" 2. It is impossible to provide qualified trained personnel and pay adequate salaries without knowledge of O&M requirements such as: A. Funding for pre- and post-start-up training B. Training as part of the plan of operation
C. Inadequate Laboratory Facilities	1. Laboratory testing procedures are necessary to determine the efficiency of plant operation 2. Without these procedures poor operation practices result 3. No means to monitor NPDES effluent requirements
D. Nonexistent Maintenance Management Program	1. O&M suffers when an effective maintenance management program is not developed
(Note)	Caused by not knowing what or when preventive maintenance is needed and its value

D. Nonexistent Maintenance Management Program (CONT'D)	2. Early knowledge of the need for O&M manual will lead to the establishment of an efficient program
E. Useless O&M Manuals	1. Early knowledge of O&M manual requirement will help produce a usable manual 2. Early preparation (prior to Step 3) will help in developing a usable manual
F. Inflexibility in the Systems	1. Operator must be able to make changes in the operation of a treatment plant 2. If changes cannot be made, the O&M of the plant is impaired
G. Staffing Difficulties	1. Applicant must be able to attract full-time, highly skilled operators for proper and efficient staffing
(Note)	Imhoff tank and trickling filter requires fewer skilled operators than an extended aeration plant
	2. Highly skilled operators mean higher salaries for more people
H. Other Problems	1. Delays in approval of change orders result in increased costs to the applicant 2. Development of erroneous cost/benefit analysis which will result in improper plan selection 3. Applicant may select a plan that will cause bankruptcy 4. Trained operators may not be available

H. Other Problems (CONT'D)

5. Plant size
   - A. Undocumented influent characteristics will result in an oversized or undersized plant
   - B. An undersized plant cannot be operated to obtain the desired effluent
   - C. An oversized plant would astronomically increase O&M costs and cause operating problems

(Note)

Blowers may be turned off at night, and at times units may be shut down

6. Improper start-up of the treatment works
   - A. Causes delays in achieving operational objectives
   - B. Associated problems
     - 1) Lack of trained personnel
     - 2) Development of unsafe O&M
     - 3) Development of erroneous operation procedures
     - 4) Improperly operated equipment

I. Avoid Problems

1. Early planning
2. Early knowledge of PRM 77-3 will enable the applicant to develop a usable plan of operation at the beginning of the grant process
3. Early knowledge that an O&M manual is required is a must
4. Early knowledge of PRM 77-2 and participation in start-up services
5. Early knowledge and understanding of the importance of all O&M program requirements

J. Case Histories (I.S.-05)	1. (Distribute Step 1 Case Histories (I.S.-05) to each participant) 2. (Discuss I.S.-05)

APPLICATION:

Group discussion with oral questions during presentation.

Project slides A: 52-59.
Discuss topics as appropriate.

SUMMARY:

If O&M is ignored from the beginning or introduced late in the construction grants program, many problems will develop.

Every effort should be made from the beginning to make the applicant aware of the importance of the O&M program requirements of the construction grants program. This will help to reduce O&M problems.

O&M CONSIDERATIONS

STEP 2

CONSTRUCTION GRANTS PROCESS

UNIT
3

U3

UNIT THREE

OBJECTIVES

Following the Unit Three presentation the participant will be able to:

1. Recognize and discuss the phases in Step 2 of the Construction Grants Process.
2. Determine and explain the O&M considerations that must be included in the Step 2 application.
3. Identify and explain the O&M program requirements that must be discussed at a predesign conference.
4. Evaluate operation and maintenance needs of the design of a wastewater treatment facility.
5. Utilize various review techniques in the review of plans and specifications.
6. Determine that all O&M program requirements have been included in the plans and specifications.
7. Utilize, in conducting a review, the information contained in EPA MCD-05, Design Criteria for Mechanical, Electrical, and Fluid System and Component Reliability.
8. Evaluate the plan of operation for O&M program requirement compliance.
9. Discuss problems that may develop if O&M is not considered in Step 2.
10. Identify and use the Operational Review Checklist in the Step 2 Application Review Predesign Conference, Plans and Specifications Review, and Plan of Operation Review.

COURSE: O&M CONSIDERATIONS IN THE CONSTRUCTION GRANTS PROCESS
UNIT: THREE
SUBJECT: O&M CONSIDERATIONS IN STEP 2 OF THE CONSTRUCTION GRANTS PROCESS
LESSON 1: OVERVIEW OF THE STEP 2 PROCESS

MATERIALS:

Slide projector, screen
Slide set A: slides 59-61

REFERENCE: Participant Handbook, pages 3-4 to 3-7

PERFORMANCE OBJECTIVES:

The participant will be able to:
1. Recognize and discuss the phases in Step 2 of the Construction Grants Process.
2. Identify and explain the contents of the Step 2 grant application.

LESSON INTRODUCTION:

Step 1 was the planning step. Now we progress to Step 2, the design phase. At this time we will discuss the phases in the Step 2 process:

Application
Predesign conference
Plans, specifications, and estimates
Plan of operation
O&M manual

LESSON PRESENTATION:

A. Application Introduction

1. Contains the following basic items:

   A. Approved facility plan

   B. State priority certification

   C. Application form

A. Application Introduction (CONT'D)

D. Proposed subagreements

E. Evidence of compliance with:

1) User charge
2) Industrial cost recovery

(Note)

ICR must be complied with until it is repealed

F. Sewer use ordinance

G. Service agreements

H. Civil rights compliance

I. Relocation and land acquisition provisions

2. Application package

A. Is reviewed

B. Must be approved by state and EPA

B. Contents of Application

1. Approved facility plan

A. Is required

B. If plan has been approved by EPA, a copy of the approval letter should be submitted

2. State priority certification is reviewed to determine if:

A. Project is on state priority list

B. Name, number, and description of project agree with application and list

C. Application includes signature of authorized state official

D. Award of grant assistance for the project will not:

1) Exceed the state's allotment

B. Contents of Application (CONT'D)

   2) Jeopardize the funding of any project of higher authority

  E. Clearinghouse approval is included

3. Grant application form is reviewed to determine that:

  A. Name, project number, description of grant, and amount of grant request agree with state priority certification and list

  B. Form is signed by authorized representative

  C. Copy of authorized resolution is attached

  D. Statement relative to availability of site is attached

  E. Information corresponds to facility plan

   1) Project location
   2) Entities involved
   3) Cost data

  F. Proposed method of financing nonfederal share is assured

  G. All assurances are included in the application

4. Proposed subagreements

  A. Submitted by the applicant

  B. Reviewed by the state and EPA to determine that:

   1) Scope of work is sufficient to prepare approvable plans and specifications
   2) Complete schedules are reasonable and in agreement with the facility plan

B. Contents of Application (CONT'D)

5. User charge system

   A. At time of application for a Step 2 grant, applicants must submit:

      1) Statement of resolution
      2) Completion schedule

   B. Must be ready for implementation by the time the project is completed

   C. User charge must be approved by Regional Administrator on all Step 3 grants submitted after June 30, 1979

6. Industrial cost recovery system

(Note)

Must be complied with until it is repealed

   A. Recovers from industrial users that portion of the federal grant which is equal to the industry's share of capital cost of the project

      1) Half kept by grantee
      2) Half returned to federal government

   B. Letter of intent to comply

      1) From each industry contributing 10 percent or more of the sewage flow
      2) At the time of a Step 2 grant application

7. Sewer use ordinance must be included in a Step 2 application

   A. A copy of existing ordinance

   B. Or a letter of intent that such ordinances will be enacted

8. Uniform Relocation and Land Acquisition Policies Act of 1970

   A. Affects projects which entail the acquisition of private propery

B. Contents of Application (CONT'D)

- B. Application must include a statement assuring compliance with provisions

9. Civil rights compliance
   - A. Equal employment opportunity provisions of the law must be followed
   - B. Made a part of the specifications

C. Predesign Conference

1. Participants
   - A. Applicant
   - B. Engineer
   - C. State personnel
   - D. EPA
   - E. O&M specialist
2. Items discussed should include designs for:
   - A. Flexibility
   - B. Maintainability
   - C. Operability
   - D. Safety

(Note)

Everyone should be aware of the necessity of considering O&M in the design of the plant

D Plans, Specifications, and Estimates

1. Is the end product of the Step 2 detailed design
2. Suitable for bidding and construction purposes

(Note)

Construction contracts are subject to the provisions of the Davis-Bacon Act which requires that contractors pay employees minimum wages

D. Plans, Specifications, and Estimates (CONT'D)	3. Building located in a flood hazard area must be insured under the flood insurance program
E. Plan of Operation	1. Required for all plants 2. List of actions needed to ready the plant and its personnel for operation when construction is complete 3. Should consider: A. Staffing requirements B. Training requirements C. O&M procedures D. Records and reports E. Laboratory testing
F. O&M Manual	1. Prepared in conjunction with the plan of operation 2. Provides plant personnel with detailed instructions for assuring: A. Efficient operation B. Proper maintenance

APPLICATION:

Group discussion with oral questions during the presentation.

SUMMARY:

(Project slides A: 59-62.)
(Summarize and discuss with applicants as appropriate.)

SUMMARY:
(CONT'D)

Every phase in Step 2 of the Construction Grants Process is important.

To develop an understanding of these phases requires continuous training.

COURSE: O&M CONSIDERATIONS IN THE CONSTRUCTION GRANTS PROCESS
UNIT: THREE
SUBJECT: OPERATIONAL REQUIREMENTS IN STEP 2 GRANTS
LESSON 2: OPERATIONAL CONSIDERATIONS IN STEP 2

MATERIALS:

Overhead projector, screen
Slide projector
Transparency 20
Slide set A: slides 61-71

REFERENCE: Participant Handbook, pages 3-8 to 3-10

PERFORMANCE OBJECTIVE:

The participant will be able to determine the O&M considerations that must be included in the Step 2 application.

LESSON INTRODUCTION:

The consideration of O&M does not end with the approval of the facility plan. The need to recognize and implement O&M program concerns extends throughout the entire construction grants program. There are special O&M concerns that must be stressed in Step 2 of the grants process.

LESSON PRESENTATION:	
A. Reviews	1. Types A. Administrative B. Technical C. Operation 2. All are important
(Note)	Some may overlap
	3. Mainly concerned with operation review
B. Operation Review	1. The reviewer must determine that the following Step 2 requirements are met:

B. Operation Review (CONT'D)

A. Schedule for complying with:

   1) 40 CFR 35.925-10
   2) 40 CFR 35.935-12

B. Must include a schedule for completion of preliminary plan of operation

C. Applicant must have legal authority to:

   1) Design
   2) Finance
   3) Construct
   4) Operate and maintain the wastewater treatment facility

D. Assurance form part of EPA form 5700-25 properly signed

E. User charge and implementation schedules submitted

F. All proposed service agreements submitted

G. Proposed contracts and subagreements are submitted

H. Signature on Step 2 application is same as the one on Step 1

I. All deficiencies must be corrected before proceeding

C. Application Step 2 Review Operation Checklist (O/H-20)

1. (Refer to checklist on page 3-45 of Participant Handbook)
2. Become familiar with checklist
3. Utilize checklist when conducting a Step 2 application review

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APPLICATION:

Group discussion with oral questions during the presentation.

SUMMARY:

(Project slides A: 61-71.)
(Summarize and discuss with participants as appropriate.)

The Step 2 application must include O&M considerations. The applicant must submit documented proof of compliance with all Step 2 O&M program concerns. Upon approval of a Step 2 application, a predesign conference should be scheduled.

COURSE: O&M CONSIDERATIONS IN THE CONSTRUCTION GRANTS PROCESS
UNIT: THREE
SUBJECT: OPERATIONAL REQUIREMENTS IN THE STEP 2 PROCESS
LESSON 3: OPERATIONAL CONSIDERATIONS AT THE PREDESIGN CONFERENCE

MATERIALS:

Overhead projector, screen	Transparency 21
Slide projector	Slide set A; slides 71-76

REFERENCE: Participant Handbook, pages 3-10 to 3-13

PERFORMANCE OBJECTIVE:

The participant will be able to identify and explain the O&M program requirements that must be discussed at a predesign conference.

LESSON INTRODUCTION:

A predesign conference should be scheduled upon approval of the Step 2 application.

This conference is held to ensure that plans and specifications are developed according to sound engineering principles and that all program requirements are met.

LESSON PRESENTATION:

A. Predesign Conference	1. Should be mandatory 2. Will promote A. Planning B. Coordination C. Completion of design phase 3. Should cover all program O&M requirements
B. Discussion of O&M Requirements	1. Reviewer should stress design: A. Flexibility

B. Discussion of O&M Requirements (CONT'D)	
	B. Operability
	C. Maintainability
(Note)	Plans and specifications must allow for same as above
	2. Requirements of preliminary plan of operation
	3. O&M requirements of 40 CFR 34.935-12 must be stressed
	4. The need for the emergency operating plan
	5. Emphasis on routing flow flexibility
	6. Reviewer should cover the need for developing:
	A. Process control
	B. Testing procedures
	C. Records
	D. Training and staffing plan
	7. The grantee must be reminded of the need to budget for O&M
(Note)	O&M will cost more over life of plant than construction cost
	8. All required ordinances
	9. All line item costs
	A. Plan of operation
	B. Start-up services
	C. O&M manual preparation
	10. The responsibilities and liabilities of the grantee, consultant, contractor, EPA, and state as outlined under the following statutes:
	A. CFR 35.935-5 Grantee's responsibilities

B. Discussion of O&M Requirements (CONT'D)	B. 40 CFR 35.937 subagreements for architectural or engineering services C. 40 CFR 35.938 construction contracts (subagreements) of grantees D. Appendix C-1 of 40 CFR required provisions consulting engineering agreements E. Appendix C-2 of 40 CFR required provisions construction contracts 11. Grantee must provide documentation of influent characteristics
(Note)	Plant design is based upon influent characteristics and effluent limitations 12. All O&M requirements covered at preapplication conference 13. 40 CFR Appendix C-1, consulting Engineering Agreements 14. 40 CFR Appendix C-2, Constructing Contracts
C. Predesign Conference O&M Considerations for Discussion (O/H-21)	1. (Refer to page 3-46 in Participant Handbook) 2. Utilize checklist when conducting the predesign conference

APPLICATION:

Group discussion with oral questions during presentation.

SUMMARY:

(Project slides A: 71-76.)

SUMMARY:
(CONT'D)

(Summarize and discuss with participants as appropriate.)

The predesign conference is a useful tool and an important part of the grants process. It can be used to make the applicant aware of the O&M program requirements.

The grantee can be reminded of requirements for proper and effective O&M of the facility. The conference should be a program requirement.

COURSE: O&M CONSIDERATIONS IN THE CONSTRUCTION GRANTS PROCESS
UNIT: THREE
SUBJECT: OPERATIONAL REQUIREMENTS IN THE STEP 2 PROCESS
LESSON 4: OPERATIONAL CONSIDERATIONS IN DESIGN

MATERIALS:

Slide projector, screen
Slide set A: slides 76-80

REFERENCE: Participant Handbook, pages 3-13 to 3-17

PERFORMANCE OBJECTIVE:

The participant will be able to evaluate operation and maintenance needs of the design of a wastewater treatment facility.

LESSON INTRODUCTION:

The design of a wastewater treatment facility sets the stage for operation and maintenance. The reviewer must understand the relationship between O&M and design.

There are many design considerations that can affect O&M. The reviewer should become familiar with these. This will enable the reviewer to perform a more effective review.

What design considerations may affect O&M?

LESSON PRESENTATION:

A. Design Considerations	1. Plan site
(Note)	Can place many restrictions on design; ie. size, layout in swamps, etc.
	2. Influent characteristics
(Note)	Plant design based upon this; documentation is important
	3. Plant size
	A. Relation to

A. Design Considerations (CONT'D)

1) Simplicity and flexibility
2) Number of units

B. Must not be overdone

(Note) Example: Some engineers have omitted grit chambers which causes problems later

4. Plan layout

A. Placement of plant components may affect the staff's attitude toward the facility, causing O&M to suffer

B. Example: Provide observation windows when possible

5. Climate

A. Local climate will cause differences in design (drainage, rainfall, evaporation, wind, etc.)

B. Winter causes problems especially in areas that are subject to freezing

1) Unprotected process units will freeze
2) May be impossible to take samples
3) Sampling becomes dangerous
4) Sludge handling becomes a serious problem

(Note) Design must consider problems

6. Materials handling

(Note) Unnecessary handling of materials should be avoided

7. Plan hydraulic arrangement

(Note) Piping arrangement to allow unit removal without causing a downstream or upstream unit removal

8. Equipment selection

A. Can have a major impact on plant operation and maintenance

A. Design Considerations (CONT'D)	B. Should include a source of spare parts C. Before approving or disapproving equipment selection (criteria) 1) Reviewer must weight "two brand names" or equal 2) "Buy American" 9. Safety A. Very important B. If a task is unsafe the operator will not do the task
(Note)	Provide adequate lighting
B. Design Concepts	1. The design should exhibit: A. Flexibility: ability to change mode of operation easily
(Note)	Used in subsystems
	B. Operability: ability of the operation to produce required results under various flows and loads
(Note)	Operator convenience must be considered; the easier the job, the more likely it will be done
	C. Maintainability: ability to perform the maintenance task
(Note)	Example: Provide space for the removal and replacement of mechanical components
	D. Reliability: ability to perform designated function consistently
(Note)	Use as much equipment as one manufacturer as possible (pumps, meters, etc.)

B. Design Concepts (CONT'D)

E. Durability: ability to function satisfactorily for a specified period of time without disrupting the process

F. Economical: ability to produce results at lowest possible cost

1) The most energy efficient equipment should be used
2) Since incinerators are very costly to operate, consider another method of sludge disposal

2. Must be able to do the above without disrupting the process

3. Absence of any of the above will reduce operational performance

APPLICATION:

Group discussion with oral questions during presentation.

SUMMARY:

(Project slides A: 76-80.)
(Summarize and discuss with participants as appropriate.)

The reviewer must determine if the design of a wastewater treatment facility lends itself to proper and effective facility O&M.

Utilizing the design considerations and concepts that we discussed will lead to better designed wastewater treatment facilities and improved O&M.

COURSE: O&M CONSIDERATIONS IN THE CONSTRUCTION GRANTS PROCESS
UNIT: THREE
SUBJECT: OPERATIONAL REVIEW OF PLANS AND SPECIFICATIONS
LESSON 5: REVIEW TECHNIQUES

MATERIALS:

Slide projector, screen
Slide set B: slides 1-8

REFERENCE: Participant Handbook, pages 3-18 to 3-21

PERFORMANCE OBJECTIVE:

The participant will be able to utilize various review techniques in the review of plans and specifications.

LESSON INTRODUCTION:

To assure that the facility to be constructed will meet effluent and statutory requirements, a review of plans and specifications is necessary.

LESSON PRESENTATION:

A. Review	1. Periodic reviews
(Note)	Depends upon complexity of projects
	2. Time frame
	A. One month
	B. To over a year
	3. Conduct review meetings at completion of:
	A. 25 percent
	B. 50 percent
	C. 75 percent
	D. 90 percent

A. Review (CONT'D)

(Note) Some of the more rigorous reviews may be conducted at the 50-75 percent completion stages

4. Meetings enable designer to make corrections during plans and specifications development

5. Final plans must undergo rigorous review

(Note) Most important review

6. Responsibilities of reviewer

    A. Administrative

    B. Technical

    C. Operational

B. O&M Review Techniques

1. Plans and specifications should:

    A. Be easy to read and understand

    B. Meet objectives of facility

    C. Provide owner control over contracts and equipment suppliers

    D. Produce most cost-effective operating system for owner

2. Bidding requirements needed

(Note) Also affects O&M

    A. Performance bonds

    B. Equipment manufacturer providing training

    C. Dates when warranties begin

    D. Performance specifications in lieu of or equal

    E. Capacity and skill to the bidder to provide high quality equipment which will serve under stated operating

B. O&M Review Techniques (CONT'D)

conditions

F. Financial resources available for the amount of equipment to be supplied

G. Provision of future maintenance and service

H. Background of performance in providing financial security and quality services

I. Favorable price

J. Performance specifications

K. Design

L. Life cycle cost

M. Energy requirements

N. Justification that:

1) Project needs are met
2) Operational reliability improved
3) Better management of waste materials
4) Environmental benefits are increased

(Note)

Successful bidder should furnish shop drawings on equipment when ordered

3. Reviewer must become familiar with the engineering firms that are preparing plans and specifications

   A. Does firm use a feedback system?

   B. Does firm have qualified personnel to provide start-up services?

4. Reviewer must be aware of the function of each component of the facility

(Examples:)

   A. Screening device function is to remove coarse materials that may affect plant O&M

B. O&M Review Techniques (CONT'D)

B. Reviewer should know how to:

   1) Size tanks and equipment
   2) Determine detention time
   3) Recognize flexibility when it is provided

C. Design depends upon:

   1) Size of particles
   2) Hydraulic loading
   3) Hydraulic gradient

D. Use of this type of review aids the reviewer in conducting the review

C. Feedback System

(Note)

1. The reviewer should benefit from other reviewer's experiences

Review past O&M records of grantee applicant

2. A feedback system should be developed

   A. In-house memoranda

   B. Brainstorming sessions

   C. Reviewing plans and specifications of existing facilities with design problems

APPLICATION:

Group discussion with oral questions during the presentation.

SUMMARY:

(Project slides B: 1-8.)
(Summarize and discuss as appropriate.)

The reviewer needs to develop as many review techniques as possible.

These various techniques will aid the reviewer in conducting an operational review.

COURSE: O&M CONSIDERATIONS IN THE CONSTRUCTION GRANTS PROCESS
UNIT: THREE
SUBJECT: OPERATIONAL REVIEW OF PLANS AND SPECIFICATIONS
LESSON 6: OPERATIONAL REVIEW

MATERIALS:

Overhead projector, screen
Slide projector
Hydraulic deisgn calculation
Process design calculation
Transparency 22
Slide set B: slides 8-22

REFERENCE: Participant Handbook, pages 3-22 to 3-29

PERFORMANCE OBJECTIVE:

The participant will be able to determine that all operation and maintenance program requirements have been included in the plans and specifications.

LESSON INTRODUCTION:

The reviewer must determine if all O&M program requirements are included in the plans and specifications.

To accomplish this, the reviewer must use certain review criteria when conducting the review.

Of special interest is the operational review. The reviewer must know what to look for.

LESSON PRESENTATION:

A. Operational Review	1. Plans and specifications should include: A. Design summary B. Basis of design
(Question)	What should a design summary include?
	2. A design summary should include: A. Flow diagram B. Hydraulic profile

A. Operational Review (CONT'D)

C. Point of discharge and receiving stream name

D. Population equivalent and flow

E. Flow and load characteristics

F. Design flow, population, and year

G. Design efficiency

H. Physical characteristics of treatment units

I. An identification and justification of deviations from standard guidelines or technical bulletins

J. Sludge disposal method

K. Explanation of any unusual design feature

L. Quality and type of industrial waste

M. Design factors affected by industrial waste

N. Dimension and volume of each process unit

O. Flow rate and volume within each process compartment for minimum, average, maximum, and initial start-up

P. Expected BOD, COD, and TSS in all side streams, mixed liquor returns, etc.

Q. Recycle rate

R. Chemical additivies

S. Diagram of piping showing flows, flexibility of flow and hydraulic profiles for minimum, average, maximum, and initial start-up flows

T. Schematic of the physical controls of each process compartment

A. Operational Review (CONT'D)	
	U. The BOD, TSS, and COD removal from each process compartment
	V. A list of physical control and laboratory tests for each unit
	W. Estimated staffing for plant start-up and when plant reaches design capacity
(Question)	What is the design based upon?
	2. Basis of design
	A. Type of treatment
	B. Flow capacity
	C. Unit process
(Note)	Must justify needs of facility Reviewer must pay special attention to this information
	3. Reviewer must become aware of design error matrices; several are in existence
	4. Documentation of flow and load characteristics is needed
(Note)	Type and extent of treatment to meet effluent limitations is keyed to this data
B. Operation and Maintenance Review	1. Design should provide:
	A. Safe and easy access to all areas of the facility
(Note)	Unsafe conditions cause poor O&M
	B. A means for moving large equipment
(Note)	Track of overhead cranes should be free of obstructions
	C. Good working environment (in galleries and utility tunnels)

B. Operation and Maintenance Review (CONT'D)

(Note)

(Note)

D. Utility stations throughout plant

(Ease of access to washdown water, air, potable water, stream, etc.)

E. Openings in the floor, roof, and walls for removal of large equipment

F. Working room for O&M personnel

These six items will make operator's work easier; therefore, the work is more likely to get done

2. Design must be:

   A. Flexible

   B. Operable

   C. Maintainable

   D. Reliable

3. Plans and specifications should state requirements for process control based upon:

   A. Process requirements

   B. Efficiency of each unit

   C. True costs (initial and O&M)

   D. Staff capabilities

   E. Maintenance needs

   F. Facility expansion

   G. Access to control functions

   H. Ease of performance of control functions

4. Plans and specifications must include laboratory facilities providing for:

   A. Physical facilities

B. Operation and Maintenance Review (CONT'D)

B. Staffing

C. Unit process sampling and testing needs

D. Estimation of equipment and supplies

E. Examples that illustrate equipment needs

(Note) Includes all necessary equipment to conduct tests required by NPDES permit

5. Design must consider need for an emergency operating plan

(Note) This is part of O&M manual, but design is one of its basic elements

6. Safety procedures must be incorporated into the plans and specifications

   A. Safety will promote proper and efficient O&M

   B. Both personnel and integrity of equipment are included in safety

7. Design should minimize O&M staffing and budget requirements

   A. Staff based upon published staffing guides

   B. Comparison method

   C. Staff size function of wastewater flow

   D. Series of curves showing staff as a function of Basic Design Parameters

(Note) This is best method

   E. Staff size special investigation

B. Operation and Maintenance Review (CONT'D)

1) Often a consultant will sell a plan as one that needs a small staff
2) Once the facility is constructed, it is almost impossible to convince a town that additional staff is needed

C. Other O&M Requirements

1. Must include a preliminary plan of operation with:

   A. Description and development schedule on:

      1) Records, reports, and laboratory control
      2) Emergency operating plan
      3) O&M manual
      4) Process control and start-up

   B. Contents

      1) Completed staffing plan
      2) Tentative training plan
      3) Maintenance management schedule
      4) Operation budget
      5) Other items needed to assure implementation of action needed for plant O&M

D. Plans and Specifications Review Operation Checklist (O/H-22)

1. (Refer to checklist on page 3-48 of Participant Handbook)

2. Utilized when conducting an operation review

APPLICATION:

Group discussion with oral questions during presentation.

SUMMARY:

(Project slides B: 8-22.)
(Summarize and discuss with participants as appropriate.)

The reviewer must ensure that the design provides for ease of O&M. This is accomplished by providing for flexibility, operability, maintainability, and reliability.

In addition, the design must provide a safe and good working environment.

The reviewer must consider all of the above when reviewing plans and specifications.

COURSE: O&M CONSIDERATIONS IN THE CONSTRUCTION GRANTS PROCESS
UNIT: THREE
SUBJECT: OPERATIONAL REVIEW OF PLANS AND SPECIFICATIONS
LESSON 7: APPLICABILITY OF TECHNICAL BULLETIN

MATERIALS:

Slide projector, screen
Slide set B: slides 22-30

REFERENCE: Participant Handbook, pages 3-29 to 3-32

PERFORMANCE OBJECTIVE:

The participant will be able to utilize the information contained in EPA Technical Bulletin MCD-05 "Design Criteria for Mechanical, Electrical, and Fluid System and Component Reliability."

LESSON INTRODUCTION:

Reliability of unit processes and equipment must be incorporated into the design of the facility to ensure continuous plant operations. MDC-05 specifies operational control requirements for reliability in treatment plant design.

LESSON PRESENTATION:

A. Reliability	1. May be achieved by: A. Component backup B. Design flexibility
(Question)	2. Does the system have the ability to function without failure?
	3. Level of reliability is usually based upon cost/benefit
B. MCD-05	1. Reliability for: A. Mechanical systems B. Electrical systems

B. MCD-05
(CONT'D)

C. Fluid systems

2. Has three reliability classes

(Note) Each defined in the bulletin

3. Applicant selects reliability class

(Note) Must justify choice

4. Design flexibility is achieved and rigidity is avoided by:

   A. Having different classes

   (Note) B. By allowing alternative design criteria supported by technical justification

   C. Specifying general design criteria and requiring the designer to justify specific requirements of the design

(Note) Bulletin is a guide on how to design for reliability in treatment facilities

---

C. Use of Bulletin

1. "MCD-05" should be used as a reference for design criteria

(Note) Additions or deletions made as individual cases warrant

2. Basic reliability is component backup, but allows reliability on flexibility of design

3. Reviewer must know:

   A. Three classifications

   B. Criteria for each classification

4. To determine reliability, the plans and specifications should include:

   A. Two sources of electrical power

C. Use of Bulletin (CONT'D)

(Note)

B. Standby power

C. Multiple units and equipment

D. Holding tanks to provide storage for overflow and pump-back facilities

E. Rapid mix of disinfectant

F. Alarm systems to detect failures (in plant and at control centers)

Inclusion of these factors will lead to continuous plant operation

---

APPLICATION:

Group discussion with oral questions.

SUMMARY:

(Project slides B: 22-31.)

The reviewer must assure that all O&M requirements are considered and implemented during the Step 2 grant process.

The reviewer must summarize any comments or recommendations on operability, flexibility, maintainability, and reliability of the design.

COURSE: O&M CONSIDERATIONS IN THE CONSTRUCTION GRANTS PROCESS
UNIT: THREE
SUBJECT: O&M CONSIDERATIONS IN STEP 2 CONSTRUCTION GRANTS PROCESS
LESSON 8: PLAN OF OPERATION

MATERIALS:

Overhead projector, screen
Slide projector
Transparency 23
Slide set B: slides 30-55

REFERENCE: Participant Handbook, pages 3-33 to 3-36

PERFORMANCE OBJECTIVE:

The participant will be able to evaluate the plan of operation for program requirement compliance.

LESSON INTRODUCTION:

A plan of operation is required for all federally funded wastewater treatment facilities.

This plan of operation is a schedule of the steps and actions to be performed at a later date to ensure cost-effective, efficient, and reliable start-up and continued operation and maintenance of a wastewater treatment facility.

LESSON PRESENTATION:

A. Requirements

1. PL 92-500 Section 204 (A) (4) requires a plan of operation
2. 40 CFR 35.935-12 requires a plan of operation
3. Federal Guidelines, Operation and Maintenance of Wastewater Treatment Facilities, August 1974
4. PRM 77-3 contains the required information for plan of operation

B. Plan of Operation	1. Schedule of steps and actions
	2. Leads to cost-effective efficient start-up and continuous operation
	3. Indicates purpose, location, and time frame of each task
	4. Four general areas
	A. Administration
	B. Training
(Note)	Supervisory, operation, maintenance, laboratory, and administrative personnel training including future needs
	C. Start-up services
	D. O&M manual
	5. Early plan of operation development is desirable
	A. In Step 1
	1) Staffing and training 2) Organization structure
(Note)	Including O&M budget, operating authorities, and administrative control strategy
	3) Process control for major units and plant
(Note)	These three requirements of a facility plan are the beginning of the plan of operation
	B. In Step 2, a preliminary plan of operation is required
C. Preliminary Plan of Operation	1. Required with plans and specifications
	2. Implementation dates may be based on percentages of construction dates

C. Preliminary Plan of Operation (CONT'D)

3. Final plan submitted at 50 percent construction date

(Note)

Can be used as a checklist by grantee and reviewer to determine if A/E firm is on schedule

4. Contents

   A. Staffing and training

   B. Records, reports, and laboratory control system

   C. Process control and start-up procedures

   D. Safety program

   E. Emergency operating plan

   F. Description of the maintenance management program

   G. Development schedule for the O&M manual

   H. Tentative operation budget

   I. Tentative schedule of a sewer use ordinance

      1) Adoption
      2) Pretreatment program
      3) Industrial program
      4) First completed annual treatment system O&M report

   J. Assurances

      1) Hiring the chief operator prior to 50 percent construction
      2) Training program developed and implemented prior to start-up
      3) All staffing problems
      4) A list of positions and qualifications of personnel hired

(Note)

Prepare 30 days prior to start-up

C. Preliminary Plan of Operation (CONT'D)

5) Start-up services will be provided

K. Preliminary plan of operation submitted with plans and specifications

L. Grantee must provide proof of implementation of plan of operation

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D. Elements of Plan of Operation

1. Staffing and training
2. Records, reports, and laboratory control
3. Process control and start-up services
4. Safety
5. Emergency operating plan
6. Maintenance management
7. Operation and maintenance manual
8. Operations budget
9. Other elements

(Note)

More detailed information of these elements will be found in Federal Guidelines Operation and Maintenance of Wastewater Treatment Facilities, August 1974

E. Plan of Operation Review Criteria

(O/H-23)

1. Checklist
   A. Refer to checklist on page 3-53 of Participant Handbook
   B. Utilize checklist when conducting an operation review
2. Must obtain a chronological summary of implementation dates
3. Must contain schedule and implementation date on the elements of the plan of operation

E. Plan of Operation Review Criteria (CONT'D)

4. Reviewer should determine that:

A. Staffing and training assures:

1) Necessary personnel are hired and trained
2) Qualifications are developed
3) Chief operator by 50 percent construction
4) Training program developed

(Note) Operator certification if required

B. Records, reports, and laboratory procedures are developed

1) Adequate facilities
2) Adequate equipment and supply inventory
3) Testing and process control training
4) Defining training needs
5) Monitoring programs developed
6) Operating records
7) Records and reports system

(Note) For each unit of the plant

(Note) Details in O&M manual

C. A safety program is provided

1) Protect safety and health
2) Periodic training

(Note) Details of plan in O&M manual

D. Emergency operating plan

1) Personnel assignment
2) Cooperative agreements with fire and police
3) Prestart-up training
4) Update of employee training program and emergency operating plan

(Note) Details of plan in O&M manual

E. Plan of Operation Review Criteria (CONT'D)

E. Maintenance management program is developed including:

1) Routine and preventive maintenance
2) Inventory of spare parts and tools
3) O&M training
    a. On equipment by suppliers
    b. On system
4) Develops record system
5) Prestart-up maintenance schedule

F. Ensure O&M manual is developed

1) Preliminary by 50 percent completion
2) Final by 90 percent completion

G. Sewer maintenance program

1) Preventive and corrective
2) Reduce or eliminate I/I

H. Budgetary constraints must be considered

1) Prestart-up
2) Start-up
3) Operation and maintenace budget by category and cost
4) Planning O&M manual budget
    a. Estimating annual budget
    b. User charge system
    c. Industrial cost recovery system

I. Other

1) Sewer use ordinance
2) Industrial pretreatment ordinance

E. Plan of Operation Review Criteria (CONT'D)	3) Sewer rehabilitation ordinance 4) User charge rate structure and ordinance 5) Industrial cost recovery system and ordinance 6) Compliance with all state and local laws
(Note)	Grantee must provide proof of implementation of plan of operation

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APPLICATION:

Group discussion with oral questions.

SUMMARY:

(Project slides B: 30-55.)
(Summarize and disucss with participants as appropriate.)

Proper O&M of federally funded treatment works is a must.

PL 92-500 Section 204(A) (4) and 40 CFR 35.935-12 require proper and efficient operation. A plan of operation is part of this requirement.

The plan of operation is a schedule of implementation of tasks to ensure cost-effective and timely achievement of design criteria. It must be reviewed carefully to ensure that this goal is reached.

COURSE: O&M CONSIDERATIONS IN THE CONSTRUCTION GRANTS PROCESS
UNIT: THREE
SUBJECT: PLAN OF OPERATION
LESSON 9: REVIEW EXERCISE ON PLAN OF OPERATION

MATERIALS:

For each participant:
Final Plan of Operation (P.E. "Slide Rule" McGraw-I.S.-06)
Final Plan of Operation (P.E. "Calculator" McGraw-I.S.-07)

REFERENCE: Participant Handbook, page 3-50

NOTE TO INSTRUCTOR:

The purpose of this exercise is to develop and improve the skills necessary to conduct an operational review of a plan of operation using the Review Operation Checklist on page 3-50.

PERFORMANCE OBJECTIVES:

The participant will be able to:

1. Conduct an operational review on a preliminary or final plan of operation.
2. Determine if O&M concerns have been considered.
3. Determine if the plan of operation was listed as a separate line item.
4. Determine if the plan of operation will result in a timely and cost-effective start-up of the facility.

PROCEDURE FOR CONDUCTING PARTICIPANT EXERCISE:

1. Divide participants into groups.
2. Explain purpose of exercise.
3. Provide each participant with a Final Plan of Operation (P.E. "Slide Rule" McGraw-I.S.-06).
4. Have participant read I.S.-06 and identify weak or missing areas of the operation.
5. After groups have completed exercise, conduct a discussion concerning problem areas.
6. After discussion of I.S.-06, provide each participant with a Final Plan of Operation (P.E. "Calculator" McGraw-I.S.-07).

(Note:) There may be more points for discussion in the two Final Plans of Operation than stated in this exercise.

MAJOR POINTS TO BE EMPHASIZED:

1. Introduction (page 1)

   Does not indicate that a copy of draft O&M manual will be furnished.

2. Summary of Implementation Dates:

   a. (page 2)

      1) Does not indicate that a sewer use ordinance to accommodate industrial discharges will be developed.
         10 (a) October 1978

      2) Does not indicate that the grantee will begin finalization of cooperative agreements with other agencies.
         6 (b) May 1979

   b. (page 3)

      1) Does not indicate the need for a laboratory supply inventory.

      2) 7(f) should be 7(c)

      3) Does not indicate that cooperative assistance agreements will be finalized.
         6(b) August 1979

      4) Does not indicate that inventory of laboratory supplies will be completed.
         3(b) September 1979

      5) Does not indicate that training on maintenance management system usage will be provided.
         7(b) September 1979

      6) Does not indicate that training on maintenance management system usage will be completed.
         7(b) October 1974

      7) Does not indicate that wet and dry testing of all equipment will be conducted.
         4(c) November 1979

      8) 7(f) should be 7(c) (page 4)

   c. (page 4)

      Does not indicate that O&M manual will be updated.

3. Staffing and Training (page 5):

   "Slide Rule" does not anticipate that additional training is needed nor does he indicate the availability of training.

4. Records, Reports, and Laboratory Controls (page 6):

MAJOR POINTS TO BE EMPHASIZED:
(CONT'D)

"Slide Rule" does not intend to provide an inventory of laboratory supplies (no starting or completion date).

5. Progress Control and Start-up Procedures (page 7):

   "Slide Rule" is not going to conduct wet and dry testing of all equipment (no completion date).

6. Emergency Operating Plan (page 9):

   "Slide Rule" does not indicate that cooperative assistance agreements with other agencies is needed (no starting or completion date).

7. Maintenance Management (page 10):

   "Slide Rule" does not believe that training on the system is needed (no starting or completion dates).

8. Operation and Maintenance Manual (page 11):

   "Slide Rule" does not believe that there is any real need to update the O&M manual based on the first year of operating experience (no date).

9. Operation Budget (page 12):

   "Slide Rule" does not believe in training very much. Only allots one tenth of one percent (.1 percent). Should allot 4 percent to 7 percent.

10. Other Elements (page 13):

    "Slide Rule" is not going to conduct the first annual treatment system O&M report including recommendations on budget, staffing, training, maintenance and repairs, and future needs.

(Note) The participants may find other problems with the Plan of Operation.

COURSE: O&M CONSIDERATIONS IN THE CONSTRUCTION GRANTS PROCESS
UNIT: THREE
SUBJECT: O&M CONSIDERATIONS IN STEP 2 OF THE CONSTRUCTION GRANTS PROCESS
LESSON 10: POSSIBLE PROBLEMS THAT MAY DEVELOP IF O&M IS NOT CONSIDERED IN STEP 2

MATERIALS:

Slide projector, screen
Slide set B: slides 55-57

REFERENCE: Participant Handbook, pages 3-43 to 3-44

PERFORMANCE OBJECTIVES:

The participant will be able to identify and discuss problems which may develop if O&M is not considered in Step 2 of the Construction Grants Process.

LESSON INTRODUCTION:

O&M considerations may be overlooked when a wastewater treatment facility is designed.

Many problems has been created by design errors.

What problems may develop?

LESSON PRESENTATION

A. Example Problems	1. Lack of grit removal
(Note)	Grit takes up space in aeration chambers and wears out pumps
	2. Inadequate consideration of flow and load variation
(Note)	Minimum, average, peak, and initial start-up flows; no provision for flow equalization
	3. Effects of climate
	A. Especially in areas subject to long periods of freezing weather

A. Example Problems (CONT'D)

B. Designer must consider local climatic condition

4. Poor hydraulic equipment

5. Lack of hoists to remove pumps, large objects

(Note) Eyebolt may be used in some instances

6. Inefficient equipment placement

(Question) What are some other problems?

7. Control panel access doors may be located near wall

8. Pumps, blowers, chlorinators may be oversized

9. (Ask for more examples)

B. Results of Problems

1. Plant shutdown
2. Unnecessary expense
3. Delay in approval of plans and specifications
4. Construction problems

APPLICATION:

Discussion with oral questions.

SUMMARY:

(Project slides B: 55-57.)
(Summarize and discuss with participants as appropriate.)

If O&M is not considered during the Step 2 process (design), many problems may develop.

The designer, grantee, and reviewer should be aware of kinds of problems that can develop if O&M is not considered in design.

O&M CONSIDERATIONS

STEP 3

...CONSTRUCTION GRANTS PROCESS

UNIT 4

U4

UNIT FOUR

OBJECTIVES

Following the Unit Four presentation, the participant will be able to:

1. Recognize and discuss Step 3 of the Construction Grants Process.
2. Identify and discuss operation and maintenance requirements in the Step 3 application.
3. Explain the responsibilities of each participant in the preconstruction conference.
4. Recognize and explain the operation and maintenance payment conditions of:
    a. O&M manual
    b. User charge system
    c. Industrial cost recovery system
    d. Sewer use ordinances
    e. Sewer system rehabilitation program
5. Recognize and explain the purposes for O&M manual development.
6. Determine and discuss the contents of the O&M manual.
7. Utilize the review criteria and checklist during O&M manual evaluation.
8. Discuss problems that may develop if O&M is not considered in Step 3.

COURSE: O&M CONSIDERATIONS IN THE CONSTRUCTION GRANTS PROCESS
UNIT: FOUR
SUBJECT: STEP 3 OF THE CONSTRUCTION GRANTS PROCESS
LESSON 1: OVERVIEW OF THE STEP 3 PROCESS

MATERIALS:

Slide projector, screen
Slide set B: slides 57-59

REFERENCE: Participant Handbook, pages 4-5 to 4-6

PERFORMANCE OBJECTIVES:

The participant will be able to:

1. Recognize and discuss the phases in Step 3 of the Construction Grants Process.
2. List the necessary documents in the Step 3 application.
3. Explain the process of receiving the construction bids.
4. Describe the procedure of awarding construction contracts.
5. Explain the purpose and procedures of onsite inspections.

LESSON INTRODUCTION:

Following the approval of Step 1 and Step 2 we have Step 3, the construction phase.

At this time we will discuss the phases in the Step 3 process:

Step 3 application
Receipt and review of construction bids
Award of construction contracts
Preconstruction conference
Onsite inspection

LESSON PRESENTATION:

A. Application

1. Payment schedule

   A. For disbursement of the grant funds

   B. Agreements should be reached with consultants and construction contractors

A. Application (CONT'D) (Note)	2. Includes following documents: A. Application form B. Flood insurance C. Service agreements D. UC/ICR system schedules E. Sewer rehabilitation schedules F. Plan of operation schedule G. Proposed engineering contract The state and/or EPA must approve the Step 3 application
B. Construction	1. After approval of application, EPA will authorize the grantee to advertise for bids 2. For maximum number of bidders, grantee must widely circularize the proposed project 3. Generally 30 days are allowed for receipt of bids
C. Receipt and Review of Bids	1. Sealed bids must be received and then opened publically 2. Grantee reviews the bids and prepares a recommendation for award 3. Bid documents A. Through the state B. To EPA C. For approval 4. Type of bid documents A. Certified bid tabulation

C. Receipt and Review of Bids (CONT'D)

B. Two copies of the proposal form and bonds from the apparent low bidder

C. Statement from grantee

   1) Names of bidders to whom contracts are to be awarded
   2) Amount of the contracts

D. Proof that adequate advertising and time was provided bidders

E. A copy of any addendum which was added during the bidding

F. Signed copies, by the low bidder, of compliance with EEO requirements

G. Justification by the grantee if award was made to other than the low bidder

H. Necessary revised cost estimates

I. Other documents as prescribed by:

   1) State laws
   2) Local laws
   3) Ordinances

D. Award of Construction Contracts

1. Award of contracts

   A. Authorized by EPA

   B. After EPA has received and reviewed the bid information

(Note)

Providing all requirements have been met

2. Preconstruction conference should be conducted

   A. At time of award

D. Award of Construction Contracts (CONT'D)	B. To ensure that each party understands its responsibilities
E. Preconstruction Conference	1. Participants A. Grantee B. Contractor C. State agency D. EPA E. Consultant 2. Topics A. Minimum wages 1) Posting 2) Payment B. Equal employment opportunities C. Recordkeeping D. Requirements for onsite inspections by: 1) State 2) EPA E. Processing 1) Invoices 2) Grant payment requests F. Change orders 1) Processing 2) Approvals
F. Onsite Inspection	1. Purposes A. To ensure correct management of project B. To determine if the project is on schedule

F. Onsite Inspection (CONT'D)

C. To determine if the project is being constructed according to:

   1) Plans
   2) Specifications
   3) Change orders

2. Are made:

   A. During construction (interim)

   B. At completion of the project (final)

APPLICATION:

Discussion with oral questions.

SUMMARY:

(Project slides B: 57-59.)
(Summarize and discuss with participants as appropriate.)

Construction may begin after approval of Step 1 and Step 2.

With the approval of Step 3 application, the grantee advertises for construction bids. After EPA receives the reviews the bids, construction contracts are awarded.

The preconstruction conference is held to discuss the responsibilities of each party in the project: grantee's consultant contractors, state, EPA, and inspector.

Inspections ensure correct management of the project and determine if the project is on schedule.

COURSE: O&M CONSIDERATIONS IN THE CONSTRUCTION GRANTS PROCESS
UNIT: FOUR
SUBJECT: OPERATIONAL CONSIDERATIONS IN STEP 3
LESSON 2: O&M REQUIREMENTS IN THE STEP 3 APPLICATION

MATERIALS:

Overhead projector, screen	Transparencies 24-27
Slide projector	Slide set B: slides 59-61

REFERENCE: Participant Handbook, pages 4-7 to 4-11

PERFORMANCE OBJECTIVE:

The participant will be able to:
1. Explain the importance of operation and maintenance requirements in the Step 3 application.
2. Identify and discuss operation and maintenance requirements in the Step 3 application.

LESSON INTRODUCTION:

A preliminary review and an in-depth review are conducted by the reviewers of the Step 3 application package to ensure that all construction grant O&M program requirements for a Step 3 grant are included and are complied with or will be complied with by the applicant.

LESSON PRESENTATION:

A. Review

(O/H-24)

1. Preliminary review
    A. Ensures that all of the required items are included in Step 3 application package
    B. Contact state and/or applicant
        1) If package is incomplete
        or
        2) If further explanation is needed

A. Review (CONT'D)	2. In-depth review A. Follows preliminary review B. Purposes 1) To ensure that all items affecting O&M are included 2) To ensure specific action is proposed by application
(Note)	To assure prompt and efficient O&M of the wastewater treatment facility
B. Plans and Specifications	1. Includes the required number of sets 2. Necessary corrections should have been made 3. Final approval received by the applicant 4. Reviewer should confirm that the plans and specifications have been approved by: A. Examining applicant files or B. Contacting the responsible state Water Pollution Control Agency
C. Plan of Operation	1. Confirmation of approval of plan A. Confirmed by the reviewer B. Approved by the responsible regulatory agency 2. Completion schedule A. Is required B. Must show that a final plan of operation will be submitted by the 50 percent completion date of the construction project

C. Plan of Operation (CONT'D)	3. Architectural-engineering subagreement or method of award A. Included is application B. For preparation of the final plan of operation
D. Application Form 5700-32	1. Reviewer must be aware of O&M concerns and their relation to this form 2. Relates primarily to administrative functions 3. Serves as the formal application for a construction grant 4. States: A. Necessary grant qualifications B. Applicant's assurance to satisfy all statutory requirements 5. Must be signed by the applicant 6. Must show that the applicant has legal authority concerning revenues needed for O&M A. Finance B. Construct C. Operate D. Maintain E. Collect
E. Proposed Contracts and Subagreements	1. Submitted by applicant 2. Reviewed A. By the state and/or EPA

E. Proposed Contracts and Subagreements (CONT'D)

B. To ensure that the scope and nature of the proposed service are sufficient to construct approvable facilities

3. Reviewer should determine if contractor's fees are reasonable

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F. O&M Requirements of Application

(O/H-25)

1. Sewer use ordinance

A. Must be submitted by applicant

B. Prohibits new sources of inflow from being connected to sewer systems

1) Roof drain
2) Basement sump pumps

C. Requires proper design and construction techniques for:

1) New connections
2) Pretreatment of waste prior to discharge into the system

2. Operation and maintenance scheduling

A. Proof of compliance with 40 CFR's part 35

1) 40 CFR 35.920-3(c) (3)
2) 40 CFR 35.925-10
3) 40 CFR 35.935-12

(Note)

Refer participant to appendix

B. Involves

1) O&M manual
2) Development of emergency response program
3) Staffing
4) Training
5) Laboratory testing

C. A completion schedule showing submission dates may be accepted by EPA

F. O&M Requirements of Application (CONT'D)

(Note)

Grant payments will be limited until these requirements are met and approved by the regulatory agency

3. Sewer system rehabilitation scheduling
   - A. Completion schedule must be submitted
   - B. Must be complied with before full grant payments can be made
4. Institutional agreements
   - A. To give authority and control to the applicant
   - B. Without this control, proper and efficient O&M becomes impossible
5. User charge system and ICR
   - A. Submitted by the applicant
   - B. Grant payments can be delayed until systems are approved and adopted

(Note)

Monies for O&M Budget comes from user charge system and ICR

6. Industrial use and pretreatment ordinance
   - A. Evidence of the development of ordinances must be submitted by the applicant
   - B. Needed if there are industrial users discharging toxic or incompatible waste which requires pretreatment prior to discharge into the collection system

---

G. O&M Manual

1. Draft of manual must occur prior to the 50 percent payment request of a Step 3 grant payment

G. O&M Manual (CONT'D)	2. Final manual must be prepared, submitted, and approved prior to the 90 percent payment request of a Step 3 grant payment
H. Staffing and Training Plan	1. Must be submitted as part of Step 3 grant 2. Provides a schedule for hiring of staff and implementation dates for training programs 3. Includes a salary schedule and training budget
I. Start-up Services	1. Included in application 2. Proposal should include: A. Pre- and posttraining plan B. "Fine tuning" of process control C. Laboratory procedures D. Maintenance management system E. Records F. O&M manual update G. Stated objectives H. Completion schedule I. Cost estimate J. Qualifications of personnel performing start-up services
J. Reviewer	1. Will make recommendations after Step 3 grant application is reviewed 2. Application may be approved after deficiencies are corrected

J. Reviewer (CONT'D) (O/H-26)	3. Preconstruction conference is then scheduled by the reviewer with: A. Grantee B. Engineering firm or consultant C. Contractor D. State E. EPA
K. Application Step 3 Review Operation Checklist (O/H-27)	1. (Refer to checklist on page 4-56 of Participant Handbook) 2. Become familiar with checklist 3. Utilize checklist when conducting an operation review of Step 3 application

APPLICATION:

Discussion with oral questions.

SUMMARY:

(Project slides B: 59-61.)
(Summarize and discuss with participants as appropriate.)

With approval of the application, a grant offer is made to the applicant. Upon acceptance of the grant offer a preconstruction conference is scheduled.

COURSE: O&M CONSIDERATIONS IN THE CONSTRUCTION GRANTS PROCESS
UNIT: FOUR
SUBJECT: OPERATIONAL CONSIDERATIONS IN STEP 3
LESSON 3: OPERATIONAL CONSIDERATIONS FOR PRECONSTRUCTION CONFERENCE

MATERIALS:

Overhead projector, screen
Slide projector
Transparency 28
Slide set B: slides 61-69

REFERENCE: Participant Handbook, pages 4-12 to 4-17

PERFORMANCE OBJECTIVES:

The participant will be able to:
1. Explain the purposes of the preconstruction conference.
2. Recognize and discuss responsibilities of each participant of the preconstruction conference.

LESSON INTRODUCTION:

A preconstruction conference should be held with the grantee, the grantee's consultant, the contractors, the state, the EPA, and the inspector.

The objective of the conference is to discuss the responsibilities of each participant in the project placing great emphasis on the O&M requirements.

LESSON PRESENTATION:

A. Purposes

1. Provides the final opportunity to discuss program requirements prior to construction
2. Regulating agency can reemphasize the program requirements
3. Serves as a means to introduce program requirements to new personnel
    A. Contractors and/or consultants
    B. Mayors

A. Purposes (CONT'D)	C. City Managers
B. Discussion Topics	1. Equal opportunity employment requirements 2. Records 3. Change orders 4. Inspections 5. Grant payments 6. Operation and maintenance requirements
(Note)	Most concerned with O&M requirements
C. Grantee's Responsibilities	1. To comply with all laws and ordinances in the construction process and subsequent plant operation A. Local B. State C. Federal 2. Have an approved preliminary plan of operation 3. To submit a start-up service proposal for approval A. Necessary to assure funding eligibility B. Will achieve operational objectives more rapidly 4. The submission requirements for completion schedule for: A. Final plan of operation B. Draft O&M manual by 50 percent payment C. Final O&M manual by 90 percent payment

C. Grantee's Responsibilities (CONT'D)

D. Staffing and training

1) Chief operator should be hired by 50 percent completion of construction
2) Training programs should be developed and implemented prior to start-up

(Note) These items must be approvable by the regulatory agency

5. Be notified of the requirement for submission of:

A. User charge

1) Provides funds of O&M of the wastewater treatment plant
2) Based on actual use or ad valorem taxes

B. Industrial cost recovery system

1) 50 percent of ICR goes to federal treasury
2) 40 percent is retained for expansion, upgrade, or reconstruction
3) 10 percent may be used as determined by the grantee

(Note) May be used to fund O&M budget

C. Sewer use ordinance

1) Prevents new sources of inflow
2) Regulates new connections
3) Provides for pretreatment if needed
4) Helps ensure proper plant performance

(Note) Reviewer should explain each ordinance and how it affects O&M

6. To provide and maintain competent and adequate engineering supervision and inspection during construction

C. Grantee's Responsibilities (CONT'D)	7. To maintain sewage treatment during the construction of new facilities
(Note)	Reviewer should explain that the passage of raw sewage must be prevented
	8. To provide ongoing protection and maintenance for equipment A. In storage B. During construction C. Before and after start-up
	9. To confirm the influent characteristics upon which the design criteria were based A. Sampling and analysis of the influent should begin early B. If characteristics were wrong, there would be time to correct the design criteria C. If characteristics were correct, the construction can proceed
	10. Should be made aware that wastewater treatment facilities constructed with federal funds are subject to inspection by: A. State B. EPA
D. Inspector's Responsibilities	1. Explain the who, why, what, when, and how of the inspection process
(Note)	Reviewer also may explain the above
	2. Attends the preapplication conference or reviews transcript of conference
(Note)	This would enable the inspector to use the information in the inspection process

C. Grantee's Responsibilities (CONT'D)	7. To maintain sewage treatment during the construction of new facilities
(Note)	Reviewer should explain that the passage of raw sewage must be prevented
	8. To provide ongoing protection and maintenance for equipment A. In storage B. During construction C. Before and after start-up
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(Note)	This would enable the inspector to use the information in the inspection process

E. Reviewer's Responsibilities

1. Remind the operator that the treatment facility must be constructed according to approved plans and specifications

(Note)

Plans and specifications reviewer (when possible) should visit site to conduct onsite inspections; this effort may result in changes that will improve facility O&M

   A. Project changes must be approved by the state or EPA which will:

      1) Alter the design or scope of the project
      2) Alter the type of treatment
      3) Require additional federal funds

   B. Certain changes do not need prior approval

      1) Resulting from minor errors in the plans and specifications
      2) Of an emergency nature

2. Restate the responsibilities of the grantee to properly and affectively operate and maintain the wastewater treatment plant

3. The responsibilities and liabilities of the grantee, consultant, contractor, EPA, and state as outlined under the following statutes:

   A. 40 CFR 35.935-5 grantee's responsibilities

   B. 40 CFR 35.937 subagreements for architectural or engineering services

   C. 40 CFR 35.938 construction contracts (subagreements) of grantees

   D. Appendix C-1 of 40 CFR required provisions consulting engineering agreements

   E. Appendix C-2 of 40 CFR re-

E. Reviewer's Responsibilities (CONT'D) (Note)	quired provisions construction contracts (Discuss 40 CFR Appendix C-1 Consulting Engineering Agreement and 40 CFR Appendix C-2 Construction Contracts in detail)
F. Preconstruction Conference Operation Considerations for Discussion (O/H-28)	1. (Refer to checklist on page 4-60 of Participant Handbook) 2. Utilize checklist when conducting preconstruction conference 3. (Review checklist)

APPLICATION:

Discussion with oral questions.

SUMMARY:

(Project slides B: 61-69.)
(Summarize and discuss with participants as appropriate.)

The preconstruction conference provides the final opportunity to discuss program O&M requirements prior to construction.

Discussion topics include equal opportunity employment requirements:

Records
Change orders
Inspections
Grant payments
Operation and maintenance requirements

The responsibilities of each participant of the conference will be discussed.

COURSE: O&M CONSIDERATIONS IN THE CONSTRUCTION GRANTS PROCESS
UNIT: FOUR
SUBJECT: OPERATIONAL CONSIDERATIONS IN STEP 3
LESSON 4: PAYMENT CONDITIONS

MATERIALS:

Overhead projector, screen
Slide projector
Step 3 O&M Document Approval (I.S.-08)
Transparency 29
Slide set B: slides 69-73

REFERENCE: Participant Handbook, pages 4-18 to 4-20

PERFORMANCE OBJECTIVES:

The participant will be able to:
1. Discuss the Step 3 grant payments according to the payment schedule.
2. Recognize and explain the purposes and payment conditions of:

    O&M manual
    User charge system
    Industrial cost recovery system
    Sewer use ordinances
    Sewer system rehabilitation program

LESSON INTRODUCTION:

Step 3 grant payments are made according to a payment schedule which is included in the grant agreement.

The grantee must request payment on form 2550-16 and supply support document.

EPA will review this form and authorize as appropriate.

LESSON PRESENTATION:

A. Limitations
(O/H-29)

1. O&M manual

    A. No more than 50 percent of the federal share is paid until a draft manual is prepared

A. Limitations (CONT'D)

B. No more than 90 percent payment is made until the final O&M manual is approved

2. User charge system

A. Before June 30, 1979

1) No more than 50 percent of federal share may be paid before evidence of the development of the system has been submitted

2) No more than 80 percent of federal share may be paid before system has been approved by the state and/or EPA

B. After June 30, 1979

(Note) No Step 3 grant assistance will be awarded unless the user charge has been approved by the regional administrator

3. Industrial cost recovery system

A. No more than 50 percent of federal share may be paid before evidence of development of a system has been submitted

B. No more than 80 percent may be paid before system is approved

4. Sewer use ordinance

(Note) No more than 80 percent of federal share may be paid until ordinance is submitted and approved

5. Sewer system rehabilitation program

(Note) No more than 80 percent of federal share may be paid until the grantee submits proof of compliance with the sewer system rehabilitation schedule

6. Final payment

A. Project must pass final inspection

A. Limitations (CONT'D)

B. Will not be made until determination has been made that the facility was satisfactorily constructed in accordance with the:

1) Grant agreement
2) Approved plans and specifications

B. User Charge System

1. Is a charge:
    A. Levied on users of a treatment works
    B. Or portion of ad valorem taxes paid by user for the user's proportionate share of O&M cost
2. User charge should be based upon:
    A. Volume
    B. Flow rates
    C. Strengths of the waste of all users

(Note)

System should bring about selfsufficiency

3. Be reviewed to ensure:
    A. Charges are equitable to all users according to flow characteristics
    B. Implementation of system will provide enough revenues to offset all O&M costs
    C. Adoption of system by all political entities within the service area
4. Payment request by grantee
    A. After review and approval
    B. After proof of adoption and implementation

C. Industrial Cost Recovery System
(Important)

1. Moratorium on ICR is no longer in effect
    A. Senate has passed a bill repealing the ICR
    B. House is expected to pass it
    C. There will have to be a conference on the two bills
    D. Anticipated that:
        1) Agreement will be reached soon
        2) ICR will be replaced
2. Grantee required to develop and implement
3. Provides the means to recover construction cost of a publically owned treatment facility
    A. Cost to be recovered by grantee during the useful life of the facility or within 30 days, whichever is less
    B. Payments must be collected annually and set aside
4. Collection of money
    A. 50 percent plus interest to U.S. Treasury
    B. Part of remaining money used to pay administration
    C. 40 percent used by grantee subject to state and/or EPA approval
    D. 10 percent can be used for any purpose except construction
5. Based upon industrial user characteristics
    A. Strength

C. Industrial Cost Recovery System (CONT'D)

- B. Flow rate
- C. Volume

6. Payments of Step 3 grant
   - A. Application will identify personnel responsible for development of system by 50 percent payment
   - B. Grantee must submit a description of system by 80 percent payment
7. Grantee is responsible for keeping accurate records of all monies collected and spent

---

D. Sewer Use Ordinances

1. Example: Found in the WPCF manual of "Practice No. 3 Regulations of Sewer Use"
2. Must be submitted by the grantee for approval by the state and/or EPA by 80 percent payment of the federal share
3. Include:
   - A. Sewer use ordinance
   - B. Industrial use ordinance
   - C. Pretreatment program ordinance
   - D. Combination of all three
4. Purposes
   - A. Eliminate new sources of inflow
   - B. Require new connections to be properly designed and constructed
   - C. Regulate the type of waste discharged
   - D. Require some type of pretreatment

D. Sewer Use Ordinances (CONT'D)	E. Require permits by industrial users F. Provide for disconnect and its penalty Should provide the mechanisms for controlling all discharges of waste into the sewer collection system
E. Sewer System Rehabilitation Program (Note)	1. Where the scope of the Step 3 grant includes sewer system rehabilitation, the applicant must submit a schedule for completing the rehabilitation program. Because the applicant is required to comply with the schedule for sewer system rehabilitation in order to receive full grant payment, the schedule must be reasonable for the work involved. It is desireable that the rehabilitation program be completed prior to completion of the plant. However, the rehabilitation program may continue beyond the sechduled start-up provided that the unfinished rehabilitation work will not have an adverse affect on the operation of the plant. 2. Schedule must be reasonable for work involved 3. Should be completed prior to completion of the plant Program may continue beyond the scheduled start-up if operation of plant is not effected 4. No more than 80 percent of the federal share of a Step 3 grant may be paid before the program has been complied with
F. Funds for O&M	1. Must be budgeted 2. Come from: A. User charge

F. Funds for O&M (I.S.-08)	B. Industrial cost recovery systems 3. Distribute Step 3 O&M document approval in Step 3 (I.S.-08) to each participant) 4. (Discuss I.S.-08)

APPLICATION:

(O/H-20) Discuss grant payment limitations. Use transparency for questions and answers on key points.

SUMMARY:

(Project slides B: 69-73.)
(Summarize and discuss with participants as appropriate.)

It is important to be able to recognize and explain the payment conditions of the O&M manual, the user charge system, the industrial cost recovery system, sewer use ordinance, and the sewer system rehabilitation program.

COURSE: O&M CONSIDERATIONS IN THE CONSTRUCTION GRANTS PROCESS
UNIT: FOUR
SUBJECT: O&M MANUAL
LESSON 5: DEVELOPMENT AND PREPARATION OF THE O&M MANUAL

MATERIALS:

Slide projector, screen
Slide set B: slides 73-79

REFERENCE: Participant Handbook, pages 4-21 to 4-24

PERFORMANCE OBJECTIVE:

The participant will be able to recognize and explain the purposes for preparing an O&M manual.

LESSON INTRODUCTION:

All wastewater treatment plants constructed with federal grant funds must have an approved O&M manual.

By answering the following questions, we can determine why an O&M manual must be prepared:

1. What is it?
2. What are its purposes?
3. Who needs it?
4. What are the regulations?
5. When should it be prepared?
6. Who prepares it?

LESSON PRESENTATION:

A. What Is It?

1. A document that provides necessary instruction to operating personnel
2. Lists designer objectives
3. Must explain the reason for the system
4. Must identify each unit and its function

A. What Is It? (CONT'D)	5. Explains the operator's responsibilities and duties 6. Must explain the daily routine procedures needed to ensure proper plant performance
B. What Are Its Purposes?	1. As a reference manual A. Used by plant O&M personnel B. To keep the plant operating efficiently 2. Training manual
(Note)	To fit the operator's needs
	3. To help understand the plans and specifications (by the contractor) 4. Used as a design tool A. By the designer B. To help ensure that an operable plant is planned and built
C. Who Needs It?	1. Facility owner A. For explanation of the plant B. To list continuing responsibilities 2. Plant superintendent A. To determine what must be done B. To determine when to implement an effective O&M program
(Note)	Staffing and training needs will be identified
	3. Contractor A. For a description of the

C. Who Needs It? (CONT'D)

treatment process

B. Enables a better job to be done

4. Resident engineer

   A. To oversee construction of the plant

   B. To provide basic tool for:

      1) Approving equipment location and installation
      2) Evaluating needs for change orders
      3) Evaluating construction in terms of operability and maintainability

5. State and federal agencies

   A. Manual is required

   B. To review and approve the manual

6. Reviewer

7. Design engineer

   A. To check the plans and specifications

   B. To aid in quick review and approval of project

   C. To convey ideas and concepts to review personnel and facility owners

   D. To assure that resident engineers and contractors do their job

D. What Are The Regulations?

"The Regional Administrator shall not pay:

1. More than 50 percent of the Federal share of any Step 3 project unless grantee has furnished:

   A. A draft of the operation

D. What Are The Regulations? (CONT'D)

and maintenance manual for review

   B. Or adequate evidence of timely development of such a draft

2. OR more than 90 percent of the Federal share unless grantee has furnished a satisfactory final operation and maintenance manual"

(Note) Interpretation of item (1) differs from EPA region to region and from state to state within the region

(Note) Unfortunately the phase "evidence of timely development" is used to obtain the 50 percent payment even when noticeable progress has not been made toward the development of the O&M manual

(Note) All regions and states require approval of the final O&M manual prior to final payment

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E. When Should It Be Prepared?

1. Early development should be encouraged

   A. So designer can correct design deficiencies during the design phase

   B. To make changes

2. Should begin at the same time the facility plan is being developed

(Note) Much of the information included in the facility plan is also included in the manual

3. No later than the preparations of the plans and specifications

(Note) Developing them concurrently will identify unique operational requirements

4. Most of manual should be com-

E. When Should It Be Prepared? (CONT'D)	plete prior to construction phase
F. Who Prepares It?	1. Best qualified personnel 2. Design engineer should prepare the overview portions of the manual 3. Resident engineer should ensure that the manual reflects "as-built" conditions of the facility 4. Plant superintendent should proofread the manual to ensure readability 5. Operator should review it

APPLICATION:

Project slides B: 73-79.
Discuss topics as appropriate.

SUMMARY:

There are many people who need, use, and prepare an O&M manual. The manaul is prepared to communicate ideas, concepts, and facts to the plant operators and maintenance staff.

If the manual is properly prepared, it can be used by all parties concerned with the wastewater treatment facilities.

COURSE: O&M CONSIDERATIONS IN THE CONSTRUCTION GRANTS PROCESS
UNIT: FOUR
SUBJECT: O&M MANUAL
LESSON 6: ELEMENTS OF AN O&M MANUAL

MATERIALS:

Overhead projector, screen
Transparencies 30-41

REFERENCE: Participant Handbook, pages 4-25 to 4-31

PERFORMANCE OBJECTIVE:

The participant will be able to determine and discuss the elements of an O&M manual.

LESSON INTRODUCTION:

The O&M manual should contain useful information for the operation and maintenance personnel. It should tell them how to operate and maintain the facility.

Today we will discuss the elements of an O&M manual.
(O/H-30) (List elements)

LESSON PRESENTATION:	
A. Introduction (O/H-31)	1. Also called overview 2. Present broad concepts of the treatment system 3. Introduce the treatment plant's overall performance objectives 4. Includes operator's goals and responsibilities
(Note)	To ensure continuous effective plant operation
B. Permits and Standards Section	1. Used to convey the importance of:

B. Permits and Standards Section (CONT'D)

(O/H-32)

- A. Plant operation and maintenance staff
- B. Need for continuous upgrading of operating skills through training

2. Explanation of each process unit including:
   - A. Process description
   - B. Operation principles
   - C. Process control procedures
   - D. Preventive maintenance
   - E. Process troubleshooting
   - F. Emergency operation and maintenance

C. Description of the Operation and Control

(O/H-33)

1. Operational procedures should be described in great detail
2. Detailed description of the characteristics of a properly operating system
3. Includes a section on troubleshooting
   - A. Problem indicators
   - B. Probable causes
   - C. Determinations of the cause by sampling, testing, monitoring
   - D. Corrective actions
   - E. Cross-reference to other sections in manual
   - F. Possible references if an explanation is needed
4. Includes a description of routine maintenance procedures for each process

D. Laboratory Testing Section (O/H-34)	1. Laboratory needs 2. Personnel requirements 3. Type of programs A. Sampling B. Testing C. Monitoring
(Note)	The need to compare the test results to other tests should be stressed
	4. Sampling locations
E. Records Section (O/H-35)	1. Facility records 2. Recordkeeping system
(Note)	The records that are kept depend upon O&M requirements and legal requirements
F. Maintenance Management Section (O/H-36)	1. Explains benefits of program 2. Should include a maintenance checklist A. Items to be done B. When to do them C. How to do them D. Frequency
G. Utilities Section (O/H-37)	1. Discusses complete system A. Location B. Routine maintenance C. Plant staff responsiblities

G. Utilities Section (CONT'D)	2. Emergency or alternate utilities need to be: A. Identified B. Located
H. Safety Section (O/H-38)	1. Emphasis on effective safety program 2. Establishes safety procedure for all O&M procedures 3. Equipment A. List B. Description C. Explain the use
I. Personnel Section (O/H-39)	1. Staffing plan for facility 2. Work organization plan 3. Shift and weekend staffing schedule 4. Organization structure 5. Training plan
J. Emergency and Response Program (O/H-40)	1. Anticipates a variety of situations 2. Presents a response action for each emergency situation 3. Should include training programs
K. Appendices (O/H-41)	1. Include useful material as a reference 2. Material usually more detailed and complex than the manual

APPLICATION:

Emphasize importance of each section with oral questions. Ask participants how the information presented will affect their facility.

SUMMARY:

The O&M manual should contain all of the elements described in this lesson. The reviewer must ensure that all of these elements are included before conducting an indepth O&M manual review.

COURSE: O&M CONSIDERATIONS IN THE CONSTRUCTION GRANTS PROCESS
UNIT: FOUR
SUBJECT: O&M MANUAL
LESSON 7: CONSIDERATIONS FOR PREPARATION OF OPERATION AND MAINTENANCE MANUALS

MATERIALS

Slide projector, screen
Slide set C: slides 1-8

REFERENCE: Participant Handbook, pages 4-31 to 4-32

PERFORMANCE OBJECTIVE:

The participant will be able to recognize Considerations for Preparation of Operation and Maintenance Manuals, and identify and explain its contents of the procedures of using it as a guide in reviewing O&M manuals.

LESSON INTRODUCTION:

PL 92-500 and 40 CFR 35.935-12 require that an O&M manual be developed for all wastewater treatment facilities constructed with federal grant funds. This document provides the basic considerations for the preparation of complete and adequate O&M manuals.

Proper use of the these considerations will assist in meeting the O&M manual requirement of the construction grants program.

LESSON PRESENTATION:

A. Purposes

1. Provides considerations for preparation of a municipal wastewater treatment facility
2. Provides a format for the organization of an O&M manual
3. Provides a suggested O&M manual checklist
4. Provides cost guidelines

B. Users	1. O&M manual authors use the manual for: A. Content B. Writing skills C. O&M upgrading and adaptability 2. Reviewer uses the manual for: A. Manual contents B. Readability C. Format D. Cost 3. Grantee uses the manual for manual: A. Requirements B. Contents C. Format D. Readability E. Feedback
C. Intent	1. Is a guideline 2. Not a rigid document 3. To speed up preparation and review of O&M manual 4. Produce readable and usable O&M manuals

APPLICATION:

Ask participants how they can apply the information presented.

SUMMARY:

(Project slides C: 1-8.)
(Summarize and discuss with participants as appropriate.)

Personnel involved in writing or reviewing an O&M manual should use the Considerations for Preparation of Operation and Maintenance Manuals as a guideline. Use of this document will help produce better O&M manuals.

COURSE: O&M CONSIDERATIONS IN THE CONSTRUCTION GRANTS PROCESS
UNIT: FOUR
SUBJECT: O&M MANUAL
LESSON 8: O&M MANUAL AND THE OPERATOR

MATERIALS:

Slide projector, screen
Slide set C: slides 8-19

REFERENCE: Participant Handbook, pages 4-33 to 4-36

LESSON OBJECTIVE:

The participant will be able to determine if the O&M manual meets the operator's needs.

LESSON INTRODUCTION:

The preparation of the O&M manual is very important. EPA has exerted a lot of effort on how an O&M manual should be prepared.

The author must consider the audience and their needs. The operator must be considered as part of the audience.

The operator needs must be met if the O&M manual is to be used by the operator.

LESSON PRESENTATION:

A. Operator Needs

1. O&M manual should:

   A. Include provisions for assuring facility O&M

   B. Contain a complete and clear table of contents

(Note)

Table of contents must be easy to use and understand

2. For convenience the manaul should be divided into four sections:

   A. Administrative section containing:

A. Operator Needs (CONT'D)

1) Introduction
2) Management responsibilities
3) Staffing and training needs
4) Public relations program
5) Permits and standards
6) Safety
7) Budget and costs
8) Emergency operating and response program

(Note)

This section is mainly for administrative personnel; however, operator should have access

B. Plant operation section containing:

1) Description of each process operation as it relates to entire plant
2) Operational procedures for normal, alternate, and common problems should be described

(Note)

Description should be a step-by-step procedure

3) Type of records needed
4) Operator personnel requirements (numbers, shifts, training, etc.)

C. Plant maintenance section containing detailed information on:

1) Planning
2) Scheduling
3) Preventive maintenance program
4) Equipment records system
5) Parts inventory system
6) Lubricants
7) Housekeeping
8) Maintenance personnel requirements

(Note)

Style, language, and format must be geared to maintenance personnel

D. Laboratory procedures section containing:

A. Operator Needs (CONT'D)

1) Detailed description of:

    a. Sampling

    b. Testing

    c. Monitoring

    d. Records

    e. Reports

    f. Personnel requirements

2) Information on interpretation of test results
3) Information on what type of results can be expected

(Note) Should also include what is expected from observations of treatment process

4) Information on the use and importance of data analysis sheets in determining trends

3. Additional operator needs

    A. Simplified diagram of:

        1) Piping
        2) Valves
        3) Controls

(Note) Detailed drawings of complicated piping areas should be included

(Note) Pictures are very useful

    B. Flow diagram of the

        1) Wastewater
        2) Air
        3) Gas
        4) Sludge
        5) Water (nonpotable)
        6) Potable water (drinking)

(Note) Should include diagrams for entire facility

A. Operator Needs (CONT'D)

C. Manufacturer's maintenance schedules

(Note)

Should be cross-referenced to a manufacturer's manual

D. Detailed safety program

E. Changes to O&M manual should be easily made

(Note)

If this can be done, a new O&M manual will not be needed every time there is a change in the facility

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B. Operator Problems With the O&M Manaul

1. Problems with content

   A. Lack of necessary data on:

      1) Process control
      2) Maintenance procedures
      3) Troubleshooting
      4) Operating instructions on equipment
      5) Laboratory procedures

(Note)

Especially on interpretation and use of results

      6) The facility
      7) Training needed

2. Problems with manual presentation

      1) Complex language
      2) No instructions
      3) Too much theory, not enough application
      4) Poor style and format
      5) Lack of availability
      6) Lengthy and bulky
      7) Hard to use

C. Solution to Problems

1. The operator should be given the opportunity to review the manual prior to submission to state/EPA for approval

2. Language should be:

   A. Simple

C. Solution to Problems (CONT'D)

B. Clear

C. Instructive

(Note)

Technical words or expressions must be clearly defined

3. Manuals should be written with step-by-step procedures for all tasks

4. Manual must be written for a specific facility

5. Manual must be short and to the point

6. Operators must have their own copy of the manual, or a pocket version of needed sections

(Note)

Pocket version is a must

7. Manual must be indexed to help operator find the information

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APPLICATION:

Project slides 8-19.

Discuss topics as appropriate.

Ask participants how the information presented will affect their facility.

SUMMARY:

The author and the reviewer of the O&M manual must become aware of the operator's problems with O&M manuals and how to solve them.

The reviewer should determine during the review of the O&M manual if the author has indeed solved the operator's problems with the O&M manual.

COURSE: O&M CONSIDERATIONS IN THE CONSTRUCTION GRANTS PROCESS
UNIT: FOUR
SUBJECT: O&M MANUAL
LESSON 9: REVIEWING THE O&M MANUAL STYLE AND FORMAT

MATERIALS:

Slide projector, screen
Slide set C: slides 19-22
Dale List of 769 Easy Words (I.S.-08) for each participant

REFERENCE: Participant Handbook, pages 4-37 to 4-39

PERFORMANCE OBJECTIVE:

The reviewer will be able to determine the language, style, format, and readability of an O&M manual.

LESSON INTRODUCTION:

The author of the O&M manual must determine the user, what the user needs to know, and how best to communicate the information.

The manual should be written with a "target audience" in mind. This will increase the use of the manual.

LESSON PRESENTATION:

A. Audience Identification

1. The reviewer must consider the primary users and review the manual for compatibility to their:
   - A. Education
   - B. Qualifications
   - C. Skills
   - D. Background
2. Manual should contain:
   - A. Routine O&M information
   - B. Information necessary for

A. Audience Identification (CONT'D)

the users to properly do the job

C. Each job's specific information

B. Improving Communication

1. Ways to improve the readability and usability of the O&M manual
   - A. Simplify the sentences
   - B. Simplify the language (vocabulary)
     - 1) Technical
     - 2) General
2. Technical vocabularies
   - A. Words and terms that are common and essential to the wastewater field
   - B. Must be defined when first used
   - C. Simplifying language does not eliminate the technical terms but gives judicious and consistent use and proper identification
3. General Vocabulary
   - A. Can be simplified to make O&M manuals easier to read
   - B. Simplification of the language is time-consuming
   - C. Many word lists are available to reviewer
   - D. One such word list is the Clarence R. Stone's Revision of the Dale Word List
     - 1) Contains 769 words
     - 2) The list can be used to predict readability of the manual
     - 3) (Distribute I.S.-09)
     - 4) (Review word list)

(I.S.-09)

B. Improving Communication (CONT'D)

4. Use of illustrations will also improve O&M manual readability
5. Table of contents, indexes, and appendices increase the usability of the manual
6. Furnishing a reference library will give user additional information sources

APPLICATION:

Project slides C: 19-22.
Discuss topics as appropriate.

SUMMARY:

The O&M manual is the user's principal source of information on facility O&M.

The manual must be plant specific. It should be cross-referenced to appendices and the reference libeary for ease of access to additional information.

The manual must be readable and usable by the operator to ensure proper plan O&M.

COURSE: O&M CONSIDERATIONS IN THE CONSTRUCTION GRANTS PROCESS
UNIT: FOUR
SUBJECT: O&M MANUAL
LESSON 10: PARTICIPANT EXERCISE ON IMPROVING O&M COMMUNICATION

MATERIALS:

Overhead projector, screen
Transparencies 42-44
Improving O&M Communication (I.S.-10) for each participant

REFERENCE: Participant Handbook, pages 4-37 to 4-39

NOTE TO INSTRUCTOR:

The purpose of this exercise is to develop and improve the participant's skills needed to conduct an operational review of O&M manuals.

PERFORMANCE OBJECTIVES:

The participant will be able to:

1. Identify technical words that must be defined for the O&M manual user.
2. Identify other vocabulary words that may present problems in understanding to the reader of an O&M manual.
3. Evaluate an O&M manual for readability.

PROCEDURE FOR CONDUCTING PARTICIPANT EXERCISE:

1. Explain purpose of exercise to participants.
2. Use transparencies 42, 43, 44 to introduce and explain exercise.
3. Provide each participant with I.S.-10 (Improving O&M Communication).
4. Instruct participant to read I.S.-10 and to:
   - A. Underline all technical terms (part 1).
   - B. Identify any other vocabulary words that might present problems (part 2).
   - C. Rewrite sentences in a simpler, easier to understand form (part 3).
5. After participants have completed the exercise, conduct a discussion concerning possible answers.

EXAMPLE ANSWERS FOR I.S.-10:

Note: Solutions may deviate slightly from the examples and still be acceptable.

1. The participants were instructed to underline all technical terms in the following paragraph:

   "Organic material serves as food for bacteria which grow and reproduce in the presence of oxygen. The amount of oxygen required by these aerobic bacteria to consume a given amount of organic material can be determined by an analytical test called the biochemical oxygen demand (BOD)."

2. The participants were instructed to identify any other vocabulary words that might present problems in understanding for the reader.

   material
   reproduce
   presence
   consume
   material
   determined
   analytical

3. The participants were instructed to rewrite the sentences in a simpler, easier to understand form.

   Organic matter serves as food for bacteria which grow when oxygen is present in the water. These bacteria are called aerobic bacteria because they need oxygen to live. The amount of oxygen used by the aerobic bacteria to eat a given amount of organic matter can be measured by a test called the biochemical oxygen demand (BOD).

COURSE: O&M CONSIDERATIONS IN THE CONSTRUCTION GRANTS PROCESS
UNIT: FOUR
SUBJECT: O&M MANUAL
LESSON 11: O&M MANUAL REVIEW CRITERIA

MATERIALS:

Overhead projector, screen
Transparencies 45-47

REFERENCE: Participant Handbook, pages 4-40 to 4-54

PERFORMANCE OBJECTIVE:

The participant will be able to evaluate an O&M manual for style and format and content by using O&M manual review criteria.

LESSON INTRODUCTION:

The grantee must submit an O&M manual for approval. The purpose of this manual is to provide information on techniques and references necessary to efficiently operate the wastewater treatment facility.

The manual must be revised by the reviewing agency for approval. The reviewer should use some type of review criteria when conducting the review.

LESSON PRESENTATION:

A. O&M Manual Review (O/H-45)	1. Review consist of two parts A. Style and format B. Content 2. Can be conducted together 3. Each review has its own criteria
B. Style and Format Review Criteria (O/H-46)	1. Language A. Simple sentences

B. Style and Format Review Criteria (CONT'D)	
	B. Level should be geared to audience
	2. Adaptation
(Note)	Should be plant specific
	3. Sections
	A. Divided according to user
	B. Provide pocket copies
	4. Materials for inclusion
	A. Include all items which pertain to the specific facility
	B. Delete textbook and standard materials
	C. "As-built" plans should not be part of manual
	5. Scope of manual
(Note)	Must address the operation and maintenance of the whole system
	6. Updating the manual
(Note)	Manual should be an open-ended dynamic document
C. Content Review Criteria	1. Introduction includes:
	A. Manual user guide
	B. Operator responsibilities
	C. Management responsibilities
	D. Available training
	E. Recommended general publications
	F. Specific publications furnished to the facility
	G. Brief description of the

C. Content Review Criteria (CONT'D)

general plant type

H. Basic flow diagram

2. The permits and standards section includes:

   A. A general discussion of plant treatment requirements and effluent limitations

   B. A list of the permits affecting the facility

   C. Permit numbers and renewal dates

   D. The summary of permit requirements

   E. Discussion of the reporting procedures for spills

   F. A discussion of the water quality standards for the receiving stream

3. Description, operation, and control of project facilities should include (for each unit process):

   A. General unit process description

   B. Major components and mechanical equipment

   C. A discussion of relationship to adjacent units

   D. Methods of control:

      1) Manual
      2) Automatic
      3) Physical
      4) Chemical
      5) Analytical
      6) Biological
      7) Laboratory control measures

   E. Common operating problems and controls explaining potential problems that are peculiar to the facility

C. Content Review Criteria (CONT'D)

F. Start-up procedures

G. Emergency shutdown procedures

H. Normal operation mode describing:

1) Valve and gate positions
2) Wastewater loadings
3) Pump settings
4) Speeds of rotating mechanical equipment
5) Process control variables

I. Alternate operational modes

J. Emergency operations and fail-safe features

4. Personnel should include:

A. A staffing and training plan

B. Qualifications for all positions with job descriptions of each

C. Details of state certification program

5. The laboratory testing and process control section includes:

A. A discussion of the sampling and testing program should include:

1) Sampling procedures and their frequency for the various laboratory tests
2) Tests to be performed
3) Definitions of important terms
4) A suggested schedule for performing various laboratory tests

B. A detailed description of each test in controlling and/or monitoring specific treatment units

C. Samples of the recommended laboratory worksheets

C. Content Review Criteria (CONT'D)

D. A list of laboratory reference materials

E. Inventory

1) Laboratory equipment
2) Supplies
3) Chemicals

6. Records section should include:

A. Facility construction records listing construction mishaps which could affect later operation

B. Daily operating log

C. State's required monthly report

D. Annual reports

E. A suggested operating cost breakdown for the treatment system and a record system for monitoring this cost

F. Personnel records procedure:

1) Training of individuals
2) Employee turnover rate

G. A system for maintaining a record of emergency situations

H. NPDES reports

(Note)

Other records such as laboratory maintenance and safety may be included but detailed descriptions of these records should be provided in the specific sections of the O&M manual

7. Maintenance management program should include:

A. An equipment record system containing the following information for each piece of equipment:

C. Content Review Criteria (CONT'D)

1) Description and identifying number with location in plant
2) Supplier
    a. Address
    b. Representative
    c. Phone number
    d. Date of purchase
    e. Purchase price
    f. Warranty provisions
3) Size, model, type, and serial number
4) Electrical and/or mechanical data
5) Spare parts in stock and the procedure for ordering spare parts or replacements
6) Preventive maintenance procedures and their frequency
7) Corrective maintenance requirements
8) A system to compile expenses for future use in budget development

B. Miscellaneous maintenance records

C. Planning and scheduling of:

1) Time
2) Personnel
3) Equipment
4) Available money

D. Storeroom and inventory system plus purchase order system

E. Special tool list and toolroom control system

F. Maintenance personnel staffing requirements:

1) Job titles
2) Job descriptions
3) Qualifications

C. Content Review Criteria (CONT'D)

G. System for cost accounting and budgeting guidelines

H. Recommended list of outside contract maintenance tasks and firms

8. Emergency operating and response plan

A. The objectives:

1) Eliminate or minimize adverse effects from emergency situations affecting the treatment system
2) Develop procedures for properly responding to emergencies
3) Provide instruction for system personnel to identify their responsibilities during emergency situations
4) Provide inventories of available emergency equipment and outline organizations for specialized assistance

B. Includes:

1) Vulnerability analysis
2) Mutual aid list of the organization to be considered during emergency
3) Emergency equipment list
4) Records preservation system
5) List of industrial wastewater sources
6) Police/fire coordination procedures
7) Detailed personnel assignment plan
8) Readiness/emergency response center description
9) Emergency operating plan
10) Spills and by-pass reporting requirements and procedures

9. The safety section should include:

C. Content Review Criteria (CONT'D)

- A. Emergency phone list
- B. Safety equipment list
- C. Hazards applicable to the treatment system
- D. List of safety references
- E. Sample accident form
- F. Periodic safety program review

10. Utilities section should include:
    - A. Names of utility suppliers
    - B. The conditions under which each fuel source is to be used
        - 1) Electrical
        - 2) Telephone
        - 3) Natural gas
        - 4) Water
        - 5) Fuel oil

11. Electrical system section should include:
    - A. Description of the power source
    - B. Description of the power distribution system
    - C. Discription of process monitoring and control instrumentation
    - D. Alternate power source described in the same detail as the primary power source

12. Appendix should include:
    - A. Schematics
    - B. Methods of preparing valve indices:
        - 1) Complete tabulation of principal valves

C. Content Review Criteria (CONT'D)

  2) Coding system for each type of valve
  3) Series of sketches for principal valves or clusters of valves

C. Sample forms

D. List of process chemicals/source

E. Detailed design criteria

F. List of equipment suppliers

G. Manufacturer's manuals

H. Service and parts source list

I. "As-built" drawings

J. Approved shop drawings

K. Dimension prints

L. Construction photos

M. Warranties and bonds

N. State O&M inspection form

O. EPA Form 7500-5

P. Sewer use ordinance

Q. Industrial ordinance and control program

R. Pretreatment controls/ordinances

S. Piping color code

T. Protective coating list

U. Sewer maintenance program

V. Map of collection system and lift stations

W. Service agreement

D. O&M Manual Review Operation Checklist (O/H-47)	1. (Refer to checklist on pages 4-63 through 4-71 of Participant Handbook) 2. Utilized for the preliminary and final O&M manual 3. (Review and discuss checklist)

APPLICATION:

Emphasize key points with oral questions.

Ask participants how they can apply the information presented.

SUMMARY:

The reviewer should use two review criteria lists to conduct the O&M manual review. Use of criteria will result in an O&M manual that will be used to operate and maintain the facility properly.

COURSE: O&M CONSIDERATIONS IN THE CONSTRUCTION GRANTS PROCESS
UNIT: FOUR
SUBJECT: O&M MANUAL
LESSON 12: REVIEW EXERCISE ON SIMPLIFYING SENTENCE STRUCTURE

MATERIALS:

For each participant:
Example of Simplifying Sentence Structure (I.S.-11)
Simplifying Sentence Structure (I.S.-12)

REFERENCE: Participant Handbook, page 4-33

NOTE TO THE INSTRUCTOR:

The purpose of this exercise is to develop and improve the participant's skills needed to conduct an operational review of the O&M manual that will improve user readability.

PERFORMANCE OBJECTIVES:

The participant will be able to:

1. Identify the need for simplifying sentence structure.
2. Improve O&M manual readability.

PROCEDURE FOR CONDUCTING PARTICIPANT EXERCISE:

1. Explain purpose of exercise to participants.
2. Provide each participant with I.S.-11 (Example of Simplifying Sentence Structure).
3. Instruct participant to read I.S.-11 and conduct a discussion concerning I.S.-11.
4. Provide each participant with I.S.-12 (Simplifying Sentence Structure).
5. Instruct participant to read I.S.-12 and to review the paragraph and simplify it by using the principle of listing to identify key points.
6. After participants have completed the exercise, conduct a discussion concerning possible answers.

EXAMPLE ANSWER FOR I.S.-12:

Note: Solutions may deviate slightly from the example and still be acceptable.

EXAMPLE ANSWER FOR I.S.-12:

1. The participants were instructed to rewrite the following paragraph and simplify it by using the principle of listing to identify key points.

   "Anyone entering a manhole or other potential methane atmosphere should ventilate the area before entering. This can be accomplished by simply uncovering the area and allowing natural ventilation; however, forced-air ventilation may be required. In no event should smoking be permitted in or around sewers, pretreatment areas, sludge digesters, settling tanks, manholes, or lift stations."

2. Example answer:

   Before entering a manhole or other area that may have methane gas:

   1. Ventilate area
      a. Uncover
      b. Allow natural ventilation
      c. Use forced ventilation if necessary
   2. Do Not allow smoking around:
      a. Sewers
      b. Pretreatment areas
      c. Slude digesters
      d. Settling tanks
      e. Manholes
      f. Lift stations

COURSE: O&M CONSIDERATIONS IN THE CONSTRUCTION GRANTS PROCESS
UNIT: FOUR
SUBJECT: O&M MANUAL
LESSON 13: PREPARATION COST

PERFORMANCE OBJECTIVE:

The participant will be able to evaluate the cost of O&M manual preparation.

LESSON INTRODUCTION:

O&M manuals currently being produced vary in their preparation cost. There are many factors which cause this variation.

LESSON PRESENTATION:

A. Cost Factors	1. Simplicity/complexity of project 2. Availability and relation to existing manuals 3. Size of facility 4. Degree of innovated technology involved 5. Amounts and strength of waste(s) 6. Amount of creative work
(Note)	Not copy work
	7. Quality of the O&M personnel available to staff plant 8. Detail of the manual
B. Review of Cost	1. Cost must be: A. Explained B. Supported 2. Use EPA form 5700-41 to request payment

B. Review of Cost (CONT'D)	3. Cost of O&M manual is reviewed on a case-by-case basis 4. Use Considerations for Preparation of Operation and Maintenance Manual Section XX as a guide when reviewing O&M cost
C. O&M Manual Size	1. Must be small enough to be useful 2. Must be large enough to contain required information 3. Should have a "pocket version" for operator's use

APPLICATION:

Ask participants how they can apply the information presented.

SUMMARY:

O&M manual preparation cost depends upon many factors. Each must be considered when determining if requested costs are allowed.

The manual should be a size that is usable and contains all needed information.

COURSE: O&M CONSIDERATIONS IN THE CONSTRUCTION GRANTS PROCESS
UNIT: FOUR
SUBJECT: O&M CONSIDERATIONS IN STEP 3
LESSON 14: PROBLEMS THAT MAY DEVELOP IF O&M IS NOT CONSIDERED IN STEP 3

MATERIALS:

Slide projector; screen
Slide set C: slides 22-24

REFERENCE: Participant Handbook, page 4-55

PERFORMANCE OBJECTIVE:

The participant will be able to identify and discuss problems which may develop if O&M is not considered in Step 3.

LESSON INTRODUCTION:

O&M considerations may be overlooked during the construction of a wastewater treatment facility.

This lack of concern for O&M considerations may cause many problems.

LESSON PRESENTATION:

A. When to Consider O&M	1. In the inspection process 2. During actual construction practices
(Note)	Various contractors should coordinate their activities to prevent problems
B. Common Problems	1. Lack of accessibility of underground piping
(Note)	Avoid placement of parking lots, buildings, tanks, etc., over laid pipes

B. Common Problems (CONT'D)

2. Blockage of hoist runways

(Note) Hoists are useless if I-beams are blocked

3. Floors sloping away from drain pipe

   A. Causes standing water

   B. Equipment will be subject to flooding

(Note) All floors should drain properly

4. Inaccessibility of meter and valves

   A. If it is not possible to regulate meters and valves, flow process control is impossible

   B. Without process control, plan operation is impossible

5. Cost overruns

6. Numerous change orders

C. Other Problems

1. (Ask participants for other possible problems)

2. (Discuss problems with participants)

APPLICATION:

Ask participants how the information presented will affect their plant situation.

What are some problems of their particular region?

SUMMARY:

(Project slides C: 22-24.)
(Summarize and discuss with participants as appropriate.)

SUMMARY:
(CONT'D)

O&M must be considered during the construction of a wastewater treatment facility.

It is very important for everyone to be aware of possible problems and to have various contractors coordinate their activities to prevent problems.

START-UP
SERVICE
PROPOSALS

UNIT
5

U5

UNIT FIVE

OBJECTIVES

Following the Unit Five presentation, the participant will be able to:

1. Discuss the planning, need, and use of start-up services.
2. Evaluate the training programs outlined in the start-up services proposal.
3. Determine the qualifications of start-up service provider.
4. List services that are grant eligible for funding.
5. Utilize review criteria in determining proposal funding eligibility.

COURSE: O&M CONSIDERATIONS IN THE CONSTRUCTION GRANTS PROCESS
UNIT: FIVE
SUBJECT: START-UP SERVICE PROPOSALS
LESSON 1: PLANNING, USE, AND NEED

MATERIALS:

Slide projector, screen
Slide set C: slides 23-31

REFERENCE: Participant Handbook, pages 5-4 to 5-7

PERFORMANCE OBJECTIVE:

The participant will be able to discuss the planning, use, and need for start-up services.

LESSON INTRODUCTION:

The construction grants program provides funds to plan, design, and construct wastewater treatment plants.

The primary function of wastewater treatment plants is to treat wastewater to obtain specific conditions and limitations on the discharge effluent.

The key to attaining plant design criteria is successful start-up services.

LESSON PRESENTATION:

A. Start-up Services

1. Defined as a series of events that lead to a stabilized, routinely controlled unit process or plant

2. Include:

   A. Prestart-up preparation

   B. Start-up of all plant units and/or processes

   C. Poststart-up training

   D. O&M manual revision

B. Planning	1. Start-up is very complex
(Note)	Start-up does not just happen
	2. It requires planning, coordination, and detailed preparation
	3. It should begin as early as Step 1
(Note)	Not required to be submitted until Step 3
C. Need	1. Provide information on:
	A. Inspecting and adjusting equipment prior to start-up
	B. Outlining the steps needed for placing each unit or process in operation
	C. Monitoring and controlling units or processes
	2. Information should be tailored to meet the needs of each plant
(Note)	Start-up services for a 1 MGD plant would be different (although there would be some similarities) to those of a 20 MGD plant
D. Use	1. To achieve operational objectives quickly by assuring that:
	A. Design operational efficiency is achieved quickly
	B. Control and related equipment problems are corrected
	C. On-the-job training is conducted
	D. O&M revision is based upon actual experience
	2. To pull together the entire O&M

D. Use
(CONT'D)

program before the closing out of Step 3 grants

3. Start-up services are the means for implementing the plan of operation using the information provided in the O&M manual

(Note)

Provides all personnel involved with the O&M program a final opportunity to evaluate and correct the entire O&M program for the facility

4. Training programs should:

   A. Provide broad knowledge of all facility:

      1) Processes
      2) Equipment
      3) Instrumentation

   B. Provide the engineer with information that can be used to develop more effective O&M program

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APPLICATION:

Project slides C: 24-31.
Discuss topics as appropriate.

SUMMARY:

Start-up services are the designer's ultimate challenge. All phases of wastewater treatment must be brought into focus in a cost-effective and timely manner.

The major objective for plant start-up is to achieve design criteria quickly and efficiently.

COURSE: O&M CONSIDERATIONS IN THE CONSTRUCTION GRANTS PROCESS
UNIT: FIVE
SUBJECT: START-UP SERVICE PROPOSALS
LESSON 2: TRAINING

MATERIALS:

Slide projector, screen
Slide set C: slides 31-38

REFERENCE: Participant Handbook, pages 5-7 to 5-11

PERFORMANCE OBJECTIVE:

The participant will be able to evaluate the training programs outlined in a start-up service proposal.

LESSON INTRODUCTION:

The most important use of start-up services is a training program. Meeting effluent performance in a cost-effective and timely manner is the objective of plant start-up.

Successful start-up is a major task which requires a training program that motivates plant personnel to work to their utmost potential.

Each element of start-up services is a training function.

LESSON PRESENTATION:

A. Start-up Training

1. Should motivate
2. Should make full use of staff potential
3. Should coordinate plant equipment operation with plant process operation
4. Should coordinate all other phases of plant operation including:
    A. Management
    B. Maintenance scheduling

A. Start-up Training (CONT'D)	C. Laboratory controls D. Use of O&M manuals 5. All elements of start-up services involve some degree of training 6. Training carried out by equipment suppliers depends upon requirements of plans and specifications and should provide for: A. Mechanical start-up services B. Process start-up services C. Training of plan personnel
(Note)	These services should be stated in terms of personnel and time
(Note)	The reviewer should look for these requirements during the plans and specifications review
	7. Should include: A. Equipment or instruments B. Start-up supervision C. Process tuning and coordination D. Contractor training
B. Elements of Effective Training Program	1. Preparation 2. Delivery 3. Followup
C. Preparation	1. Must begin early 2. Preliminary plan of operation has been prepared 3. Draft O&M manual has been prepared

C. Preparation (CONT'D)

4. Staff needs have been estimated

5. Start-up operating concepts have been formulated

(Note) As construction proceeds the final O&M manual and final plan of operation are begun

6. Training schedules must be coordinated with O&M manual development

7. Training begins sometime during construction

8. Meeting with plant staff must be held to determine the:

    A. Type of delivery

    B. Style of delivery

D. Delivery

1. Is very important

2. Must be easily understood by participants

3. Must have instructor with:

    A. Training expertise

    B. Technical expertise

4. Should include presentations that are:

    A. Short

    B. Informal

5. Must involve participants

6. Should include:

    A. Classroom training

    B. Hands-on training

(Note) Lecture approach is poorest form of delivery

E. Followup	1. Is needed because: A. Turnover rate is high B. Shortage of qualified operators exists 2. Provides an ongoing training program A. To train new employees B. Upgrade old employees

APPLICATION:

Project slides C: 31-38.
Discuss topics as appropriate.

SUMMARY:

Start-up training must be customized for the individual plant. A great amount of time and effort must be spent in preparation for start-up training. The method of delivery must fit the plant and its staff. A followup program is needed to provide ongoing training

The benefits of a good start-up program are tremendous. The plant that has a poor start-up program will pay the price for many years to come.

COURSE: O&M CONSIDERATIONS IN THE CONSTRUCITON GRANTS PROCESS
UNIT: FIVE
SUBJECT: START-UP SERVICE PROPOSALS
LESSON 3: START-UP SERVICE PROVIDER

MATERIALS

Slide projector, screen
Slide set C: slides 38-44

REFERENCE: Participant Handbook, pages 5-11 to 5-13

PERFORMANCE OBJECTIVE:

The participant will be able to determine the qualifications of the start-up service provider.

LESSON INTRODUCTION:

The start-up service providers should possess training expertise equal to or exceeding their technical expertise. The reviewer of start-up service proposals must determine if the provider is qualified to render the proposed services.

LESSON PRESENTATION:

A. PRM 77-2	1. Requires a: A. Design engineer B. Design engineer designee(s) 2. Does not address qualifications of provider
B. Engineer	1. Appears to be most logical choice 2. Knows more about plant performance objectives than anyone else 3. Must possess training expertise

B. Engineer (CONT'D)	4. Must be able to communicate technical knowledge to others
C. Designee	1. Appears to be a logical choice 2. May be on the staff of design engineer 3. May have same technical knowledge as engineer 4. Must have training expertise
D. Qualifications	1. Must have training expertise including: A. Actual training experience B. Training as a trainer 2. Must have the necessary technical knowledge 3. Must have additional resources: A. Manpower B. Technical support 4. Specialized experience and technical competence 5. Past record and performance on fullfilling contractual obligations 6. Capacity to perform the work required within time limitations (the firm's current workload must be considered) 7. Familiarity with the types of problems applicable to the project 8. Avoidance of conflict of interests 9. Philosophy on community development (which may conflict with the applicant's philosophy)

D. Qualifications (CONT'D)

10. Past performance on providing start-up services

11. Completion times

APPLICATION:

Project slides C: 38-44.
Discuss topics as appropriate.

Ask participants how they can apply this information presented.

SUMMARY:

Effective start-up depends upon technical knowledge and the ability to communicate this knowledge. Without this knowledge and ability, the goal of meeting the objective of effluent performance requirements in a cost-effective and timely manner will not be reached.

COURSE: O&M CONSIDERATIONS IN THE CONSTRUCTION GRANTS PROCESS
UNIT: FIVE
SUBJECT: START-UP PROPOSALS
LESSON 4: FUNDING AND ELIGIBILITY

MATERIALS:

Slide projector, screen
Slide set C: slides 44-49

REFERENCE: Participant Handbook, pages 5-13 to 5-17

PERFORMANCE OBJECTIVE:

The participant will be able to list the specific services that are eligible for grant funding.

LESSON INTRODUCTION:

Construction Grants Program Requirements Memorandum (PRM 77-2) identifies specific services rendered during start-up as grant fundable. These services will help ensure that the treatment facility achieves operational objectives rapidly and effectively.

LESSON PRESENTATION:

A. Funding and Eligibility

1. Start-up services must:

   A. Achieve design efficiency quickly

   B. Identify and resolve process and equipment problems

   C. Provide onsite instruction of personnel

   D. Update O&M manual

2. Eligible services must provide:

   A. Training

   B. Fine-tuning

   C. Laboratory procedures (training)

A. Funding and Eligibility (CONT'D)

D. Maintenance management (training)

E. Records management (training)

F. O&M manual revision

3. Start-up services should:

A. Average 90 man-days (not to exceed 300 man-days)

B. Be completed within 12 months

C. Be provided by a design engineer or designee

B. Participation In Start-Up Services

1. If participation is desired, the following should be accomplished.

A. A proposal is submitted with Step 3 application

B. A design engineer or designee must provide services

C. A certified operator should supervise these services

D. State and/or EPA approval must be gained

E. Proposal must contain:

1) Services requested
2) Course curriculum or training outline
3) Names and qualifications of those providing services
4) Number of man-days
5) Cost breakdown

F. Completion of start-up services within 12 months

2. Start-up services appear to be optional

(Note) This must be remedied by new PRM's

APPLICATION:

Ask participants how the information presented will affect their work or plant situation.

Project slides C: 44-49.
Discuss topics as appropriate.

SUMMARY:

To be eligible for funding, start-up services must meet the requirements in PRM 77-2. The grantee must indicate that participation in start-up services is desired. The start-up service proposal must be submitted along with the Step 3 application.

The reviewers must be familiar with all of these requirements before conducting the review.

COURSE: O&M CONSIDERATIONS IN THE CONSTRUCTION GRANTS PROCESS
UNIT: FIVE
SUBJECT: START-UP SERVICES REVIEW
LESSON 5: REVIEW CRITERIA AND CHECKLIST

MATERIALS:

Overhead projector, screen	Transparencies 48-51
Slide projector	Slide set C: slides 49-51

REFERENCE: Participant Handbook, pages 5-18 to 5-20

PERFORMANCE OBJECTIVE:

The participant will be able to determine if the start-up services proposal, as submitted, is eligible for funding.

LESSON INTRODUCTION:

Start-up services should be submitted in an itinerary form. This itinerary should list specific services to be rendered during start-up.

The reviewer must be able to determine the grant funding eligibility of start-up services.

LESSON PRESENTATION:

A. Submission	1. With Step 3 grant application 2. As a separate line item: A. For cost control B. For tracking purposes
B. Review Criteria	1. Although start-up services are a Step 3 grant item, planning must begin early 2. To be grant eligible, start-up services must provide:

B. Review Criteria (CONT'D)

- A. Pre-start-up training (including OJT)
- B. Fine-tuning of process (to optimize process control)
- C. Laboratory procedures training (for understanding of monitoring and reporting the program)
- D. Maintenance management system training (to implement maintenance management system)
- E. Records management system training (to establish and maintain a preventive maintenance program)
- F. Revision of O&M manual (based upon actual operating experience)

3. To aid in review, the proposal should:
   - A. Contain a completion schedule indicating specific services to be completed within 12 months
   - B. Include the number of man-days needed for completion
   - C. Indicate the number of man-days needed
   - D. List provider's:
     1) Qualifications
     2) Past training experience
     3) Past training programs
     4) Technical background
     5) Training background
     6) Operations background
     7) Resources to complete the required task

C. Determining Allowable Man-Days (O/H-50)

1. Start-up requirements vary depending upon:

C. Determining Allowable Man-days (CONT'D)	A. Size of plant B. Complexity of plant C. Variability of raw waste D. Effluent limitation
D. Start-up Services Review Operation Checklist (O/H-51)	1. (Refer to checklist on page 5-21 of Participant Handbook) 2. Should be utilized by reviewer when conducting a review 3. (Review and discuss checklist)

APPLICATION:

Project slides C: 49-51.
Discuss topics as appropriate.

Ask participants how they can apply the information presented.

SUMMARY:

Start-up services must assure that:

A. Design operational efficiency is achieved quickly.

B. Equipment and process problems are identified and corrected.

C. The O&M manual will be updated.

In addition, start-up services must meet all the above review criteria.

COURSE: O&M CONSIDERATIONS IN THE CONSTRUCTION GRANTS PROCESS
UNIT: FIVE
SUBJECT: START-UP SERVICES
LESSON 6: PARTICIPANT EXERCISE ON START-UP SERVICES

MATERIALS:

For each participant:
Plan of Start-up Services(A), City of Anytown (I.S.-13)
Plan of Start-Up Services(B), City of Anytown (I.S.-14)
Start-up Services for Everywhere, U.S.A. (I.S.-15)

REFERENCE: Participant Handbook, pages 5-21 to 5-22

NOTE TO INSTRUCTOR:

The purpose of this exercise is to develop and improve the participant's skills needed to conduct an operational review on a start-up service proposal utilizing Start-up Services Operation Review Checklist on page 5-21.

PERFORMANCE OBJECTIVES:

The participant will be able to:

1. Determine grant eligibility of start-up services.
2. Determine that O&M concerns have been considered.
3. Determine if start-up service cost has been listed as a separate line item.
4. Identify completion date of start-up services (within a 12-month period).
5. Conduct operational review on start-up service proposals.

PROCEDURE FOR CONDUCTING PARTICIPANT EXERCISE:

1. Divide participants into groups.
2. Explain purpose of exercise to participants.
3. Provide each participant with a Plan of Start-up Services (A), City of Anytown (I.S.-13).
4. Instruct participant to read I.S.-13 and identify any problem areas.
5. After groups have completed the exercise, conduct a discussion concerning problem areas.
6. After discussion of I.S.-13, provide each participant with a Plan of Start-Up Services(B), City of Anytown (I.S.-14), and Start-up Services for Everywhere, U.S.A. (I.S.-14).
7. Instruct participants to read I.S.-13 and I.S.-14) for review.

PROCEDURE FOR CONDUCTING PARTICIPANT EXERCISE:
(CONT'D)

Note: There may be more points for discussion in I.S.-13 than stated in this exercise.

MAJOR POINTS TO BE EMPHASIZED:

1. Staff "Onsite Training:

   Indicates that all onsite training will be related to the contact stabilization process and will not be plant specific. Also, no employee safety training program will be conducted.

2. Staffing Levels:

   Addresses itself to staffing levels only; does not mention operational requirements.

3. Laboratory Procedures:

   Does not make provisions for BOD_5 and TSS for process control or NPDES reporting.

4. O&M Manual:

   Does not indicate that the O&M manual will be revised after one year of actual operating experience.

5. Attachment #2:

   Item 3,4,5: Subtotal should be 3937, not 3939.

Note: Review of this attachment will depend mainly upon the reviewer's expertise in regard to costs, allowable man-hours, etc.

INSPECTIONS

UNIT
6

U6

UNIT SIX

OBJECTIVES

Following the Unit Six presentation, the participant will be able to:

1. Identify and discuss the three basic types of inspections:
    a. Construction (onsite)
    b. O&M concerns
    c. O&M evaluation
2. Discuss the Army Corps of Engineers' role in inspection.
3. Conduct an O&M considerations inspection to ensure that all of the O&M requirements in the Construction Grants Process are being met or have been met by the grantee.
4. Utilize interim and final construction operation review checklist.
5. Explain the enforcement procedures that may be used when it has been determined that the grantee has failed to comply with all application laws, rules, and regulations, and other attempts to resolve the problem(s) have failed.
6. Discuss the need to develop an inspection information feedback system.

COURSE: O&M CONSIDERATIONS IN THE CONSTRUCTION GRANTS PROCESS
UNIT: SIX
SUBJECT: INSPECTIONS
LESSON 1: TYPES OF INSPECTIONS

MATERIALS:

Overhead projector, screen	Transparency 52
Slide projector	Slide set C: slides 51-55

REFERENCE: Participant Handbook, page 6-4

PERFORMANCE OBJECTIVE:

The participant will be able to identify and discuss the three basic types of inspections.

LESSON INTRODUCTION:

The Construction Grants Process requires three types of inspections to be conducted during the construction of a municipal wastewater treatment plant.

In this lesson we will discuss the types of inspections and their importance.

LESSON PRESENTATION:

A. Types	1. Construction inspections (onsite)
(Note)	Several of these may be conducted
(O/H-52)	2. O&M program concerns inspection
	A. Onsite
	B. In-house
	C. May be more than one
	3. Annual evaluation of operation and maintenance of wastewater treatment plants

B. Importance	1. All three are of equal importance 2. All are necessary to ensure proper plant O&M
C. Army Corps of Engineers	1. Review plans and specifications A. Constructability B. Bidability 2. Onsite inspection during construction
(Note)	Extent of Corps' role during inspection depends upon agreement between state and/or EPA and the Corps

APPLICATION:

Project slides C: 51-55.
Discuss topics as appropriate.

SUMMARY:

The three types of inspections:

1. Onsite (construction)
2. O&M concerns
3. O&M evaluation

These are all of equal importance to ensure proper and efficient plant O&M.

COURSE: O&M CONSIDERATIONS IN THE CONSTRUCTION GRANTS PROCESS
UNIT: SIX
SUBJECT: INSPECTIONS
LESSON 2: CONSTRUCTION INSPECTIONS (ONSITE)

MATERIALS:

Slide projector, screen
Slide set C: slides 55-61

REFERENCE: Participant Handbook, pages 6-4 to 6-5

PERFORMANCE OBJECTIVES:

The participant will be able to:

1. Explain the importance of construction inspections.
2. Identify the types of construction inspections.
3. List the requirements of each type of inspection.

LESSON INTRODUCTION:

During the construction of a wastewater treatment facility, it is important that it is constructed according to approved plans and specifications. Any changes made should be approved and shown on plans.

The inspection process begins on initial day of construction.

LESSON PRESENTATION:

A. Importance

1. Made to ensure:
   - A. Proper project management
   - B. Project is on schedule
   - C. Constructed according to approved:
     1) Plans
     2) Specifications
     3) Change orders
2. Made during construction and at completion

A. Importance (CONT'D)	3. Two types A. Interim B. Final
B. Interim Inspection	1. Made during construction 2. Size and complexity determines frequency
(Note)	(May be continuous)
	3. Made by state and/or EPA, Army Corps of Engineers and/or grantee 4. Ensures A. Supervision and management B. Approved plans and specifications are adhered to C. Progress reports agree with actual observations D. Special techniques used are in accordance with the grant E. All approved plans, specifications, and change orders are at the site F. All materials and equipment are being tested
C. Final Inspection	1. Is conducted after construction is complete 2. Should consider the items under the interim (as appropriate) 3. Must ensure that: A. Facilities conform to 1) Plans 2) Specifications 3) Change orders B. All equipment works properly

C. Final Inspection (CONT'D)

C. Laboratory is complete and operable

D. All applicable laws are met

4. Must be accomplished before final payment

APPLICATION:

Project slides C: 55-61.
Discuss topics as appropriate.

Ask participants how the information presented will affect their work or plant situation.

SUMMARY:

The onsite inspections start on the first day of construction, and end when the facility passes the final inspection. The facility inspections ensure that the facility was built according to approved plans and specifications, change orders, and sound construction practices.

All parties involved in the project are protected by inspections.

COURSE: O&M CONSIDERATIONS IN THE CONSTRUCTION GRANTS PROCESS
UNIT: SIX
SUBJECT: INSPECTIONS
LESSON 3: O&M CONSIDERATIONS INSPECTIONS

MATERIALS:

Overhead projector, screen
Slide projector

Transparencies 53-54
Slide set C: slides 61-65

REFERENCE: Participant Handbook, pages 6-5 to 6-7

PERFORMANCE OBJECTIVES:

The participant will be able to:

1. Explain the importance of O&M considerations inspections.
2. Identify and explain the types of O&M considerations inspections.
3. Conduct an O&M considerations inspection to ensure that all O&M requirements in the Construction Grants Process are being met or have been met by the grantee.

LESSON INTRODUCTION:

The reviewer/inspector must utilize the PRM's, the CFR, the law and all guidelines as well as good judgement when reviewing the grantee's O&M program. A good O&M program will help to ensure proper plant performance. If the reviewer, design engineer, owner, and operator do their jobs, a good O&M program will be developed.

Now we are going to discuss the importance of O&M considerations inspections, the types of O&M considerations inspections, and the procedure for conducting an O&M considerations inspection.

LESSON PRESENTATION:	
A. Importance	1. Two types A. Interim B. Final 2. Made to ensure that grantee complies with all O&M requirements

A. Importance (CONT'D)	3. Made at construction site and "in house"
B. Interim Inspection	1. Ensures that all O&M requirements are being met by grantee 2. May be more than one 3. Made to determine that: A. Preliminary plan of operation is approved B. Final plan is being completed C. O&M manual is being finished D. Start-up services are approved and underway E. Staff is hired and trained F. UCS and ICR are being developed G. Service agreements are being completed H. Deficiency correction procedure exists I. Wastewater is being treated J. Equipment at site is being protected K. Influent characteristics are confirmed L. Design errors are being corrected M. Task in plan of operation is being completed 4. A progress report on the above is required 5. Problems must be corrected prior to final inspection 6. Grantee should be reminded of payment schedules

B. Interim Inspection (CONT'D)	7. Upon approval, final inspection may be conducted
C. Interim O&M Consideration Inspection Review Operation Checklist (O/H-53)	1. (Refer to checklist on page 6-17 of Participant Handbook) 2. Reviewer should use checklist during inspection 3. (Review and discuss checklist)
D. Final Inspection (Note)	1. Ensures all interim requirements are met Last chance to review O&M program 2. Requires the following: A. Final O&M manual approved B. Final plan of operation approved C. All elements of plan of operation completed D. O&M program evaluated and upgraded E. Maintenance management set up F. All records available to auditor G. UCS, ICR, sewer use ordinance, and service agreements completed H. Pretreatment program developed 3. Final payment dependent upon final inspection approval

E. Final O&M Consideration Inspection Review Operation Checklist	1. (Refer to checklist on page 6-1[illegible] of Participant Handbook) 2. Reviewer should use the checklist when conducting the inspection 3. (Review and discuss checklist)

APPLICATION:

Ask participants how they can apply the information presented.

Project slides C: 61-65.
Discuss topics as appropriate.

SUMMARY:

The O&M considerations inspection is about the last chance the reviewing agency has to determine if the grantee is complying with all O&M requirements.

The inspections are necessary to evaluate the O&M program and upgrade it as needed.

COURSE: O&M CONSIDERATIONS IN THE CONSTRUCTION GRANTS PROCESS
UNIT: SIX
SUBJECT: INSPECTIONS
LESSON 4: ENFORCEMENT REMEDIES

MATERIALS:

Slide projector, screen
Slide set C: slides 65-68

REFERENCE: Participant Handbook, pages 6-7 to 6-9

PERFORMANCE OBJECTIVE:

The participant will be able to explain the enforcement remedies that may be used when it has been determined that the grantee has failed to comply with all applicable laws, rules, and regulations and all other attempts to resolve the problem(s) have failed.

LESSON INTRODUCTION:

The time may come when the regulatory agency will have to resort to some means of getting the grantee to comply with the requirements of the construction grants program.

If this occasion does occur the reviewing agency must know what the remedies are or where to find them. That is what we will be concerned about in this lesson.

LESSON PRESENTATION:

A. Use of Remedies

1. Grantee must have failed or is failing to comply with all requirements

2. All attempts to resolve problems have been fruitless

3. The Regional Administrator or Assistant General Counsel of Grants approves use

(Note)

These remedies may be used to enforce the correction of deficiency found during the onsite or O&M inspections

B. Remedies	1. Withholding of funds (40 CFR 30.615-3)
	2. Stop work orders (40 CFR 30.915)
(Note)	Use of work orders indicates a serious problem
	3. Grant termination (40 CFR 30.920)
	4. Grant annulment (40 CFR 30.920-5)
(Note)	Grantee may become ineligible for future grant awards from EPA
C. Other Remedies	1. In addition to these remedies others may apply to the O&M considerations inspection
	2. Certain grant payment limitations may apply if certain O&M requirements are not met
	A. 50 percent
	B. 80 percent
	C. 90 percent
(Note)	Example: Draft O&M manual
D. Grantee Enforcement of Agreements	1. No compliance may be contractor's fault
	2. Grantee can sue to enforce contractual agreements
	3. Can enlist aid of EPA (40 CFR 35.910-contract enforcement)

APPLICATION:

Project slides C: 65-68.
Discuss topics as appropriate.

SUMMARY:

The use of the enforcement remedies to enforce program requirement compliance must be carefully considered. Approval by Regional Administrator or the Assistant General Counsel of Grants is needed in several instances.

The reviewer must try to resolve the problems with grantee before using these remedies.

COURSE: O&M CONSIDERATIONS IN THE CONSTRUCTION GRANTS PROCESS
UNIT: SIX
SUBJECT: INSPECTIONS
LESSON 5: EVALUATION OF O&M

MATERIALS:

Overhead projector, screen	Transparency 55
Slide projector	Slide set C: slides 68-74

REFERENCE: Participant Handbook, pages 6-10 to 6-13

PERFORMANCE OBJECTIVE:

The participant will be able to discuss the actions, responsibilities, enforcement, and forms of the annual O&M evaluation that the states must conduct on federally funded wastewater treatment works.

LESSON INTRODUCTION:

The states shall conduct annual O&M evaluation inspections each year for three years on all federally funded treatment facilities.

Prior to any grant awarded the states must assure the regional administrator that these inspections will be conducted.

LESSON PRESENTATION:

A. O&M Evaluation Inspection

(O/H-55)

1. Very important
2. An aid to improve plant performance
3. Done by state water pollution control agency
4. Conducted annually for three years
5. Must be clearly defined in annual state plans submitted to EPA

A. O&M Evaluation Inspection (CONT'D) (Note)	Should conduct routine interim inspection 6. Required by 40 CFR 35.935-9
B. Report Contents of EPA Form 7500-5 (Note)	As a minimum 1. General information 2. Plant loading performance data 3. Information on plant personnel 4. Identification and discussion of O&M problems 5. An evaluation of the facility 6. Additional operation and maintenance data as needed
(Note)	Inspector should use Inspector's Guide for Evaluation of Municipal Wastewater Treatment Plants, U.S.A. EPA 430/0-79-010
C. Responsibilities	1. State A. Conducts inspections B. Distributes copies 1) Authority operating treatment plant 2) EPA C. Takes action to correct deficiencies and inadequacies 2. EPA A. Identifies treatment facilities needing inspection B. Aids in correcting deficiencies and inadequacies as needed

C. Responsibilities (CONT'D)	3. Authority operating treatment works A. Cooperates with inspections B. Corrects the deficiencies and inadequacies
D. Actions	1. State A. Follows action to correct problem B. Keeps EPA informed
(Note)	(Send copies of all correspondence, etc.) C. Coordinates activities with design engineer D. Aids operator and owner by 1) Providing information sources 2) Providing sources of technical help 3) Allowing reasonable amount of time to correct problem 2. EPA A. Monitors state activities B. Provides technical information 3. Operators and owners shall correct the problem as quickly, effectively, and efficiently as time allows 4. Design engineers A. Provide technical help and information B. Use information obtained to improve design of new treatment plants

APPLICATION:

Ask participants how they can apply the information presented.

Project slides C: 68-74.
Discuss topics as appropriate.

SUMMARY:

The O&M evaluation inspection can be very useful in improving plant performance. It gives the state, EPA, owner, operator and design engineer an opportunity to work together to resolve any O&M problems found.

COURSE: O&M CONSIDERATIONS IN THE CONSTRUCTION GRANTS PROCESS
UNIT: SIX
SUBJECT: INSPECTIONS
LESSON 6: INSPECTION FEEDBACK

MATERIALS:

Overhead projector, screen	Transparencies 56-58
Slide projector	Slide set C: slides 74-80

REFERENCE: Participant Handbook, pages 6-14 to 6-16

PERFORMANCE OBJECTIVE:

The participant will be able to discuss the need to develop an inspection information feedback system.

LESSON INTRODUCTION:

A lot of information on the operation and maintenance of wastewater treatment facilities is obtained during inspections. Feedback of this information to regulatory personnel, design engineers, contractors, operators, and owners could lead to better designed, built, and operated facilities.

This lesson will be concerned with the inspection feedback system.

LESSON PRESENTATION:

A. Feedback System

1. Should be developed by
   - A. State Water Pollution Control Agencies
   - B. EPA
2. Should be used by:
   - A. States
   - B. EPA
   - C. Design engineers
   - D. Contractors

A. Feedback System (CONT'D)	E. Grantee F. O&M personnel 3. Participation should be mandatory
B. Importance (O/H-56)	1. Will eliminate undesirable design features 2. Will enhance the use of desirable design features 3. Can improve facility O&M
C. Purpose (O/H-57)	1. Identifies A. Desirable features B. Undesirable features 2. Leads to better designed and constructed facilities 3. Improves plant O&M
D. Sources of Feedback	1. Plant inspections 2. O&M evaluation reports 3. Other inspectors 4. Operators
E. Incorporation of Feedback System (Note)	1. Filing systems 2. Computer handling systems 3. In-house memorandum 4. Group discussions among inspectors and reviewers Must be accessible

E. Incorporation of Feedback System (CONT'D)	5. Presence of inspectors at preapplication, predesign, and/or preconstruction conferences
F. Sample Flow Diagram of Feedback System (O/H-58)	1. (Explain diagram) 2. (Discuss diagram)

APPLICATION:

Ask participants how the information presented will affect their work or plant situation.

SUMMARY:

(Project slides, C: 74-80).
(Discuss and summarize as appropriate).

The use of a formal information feedback system would be a tremendous step in improving plant performance.